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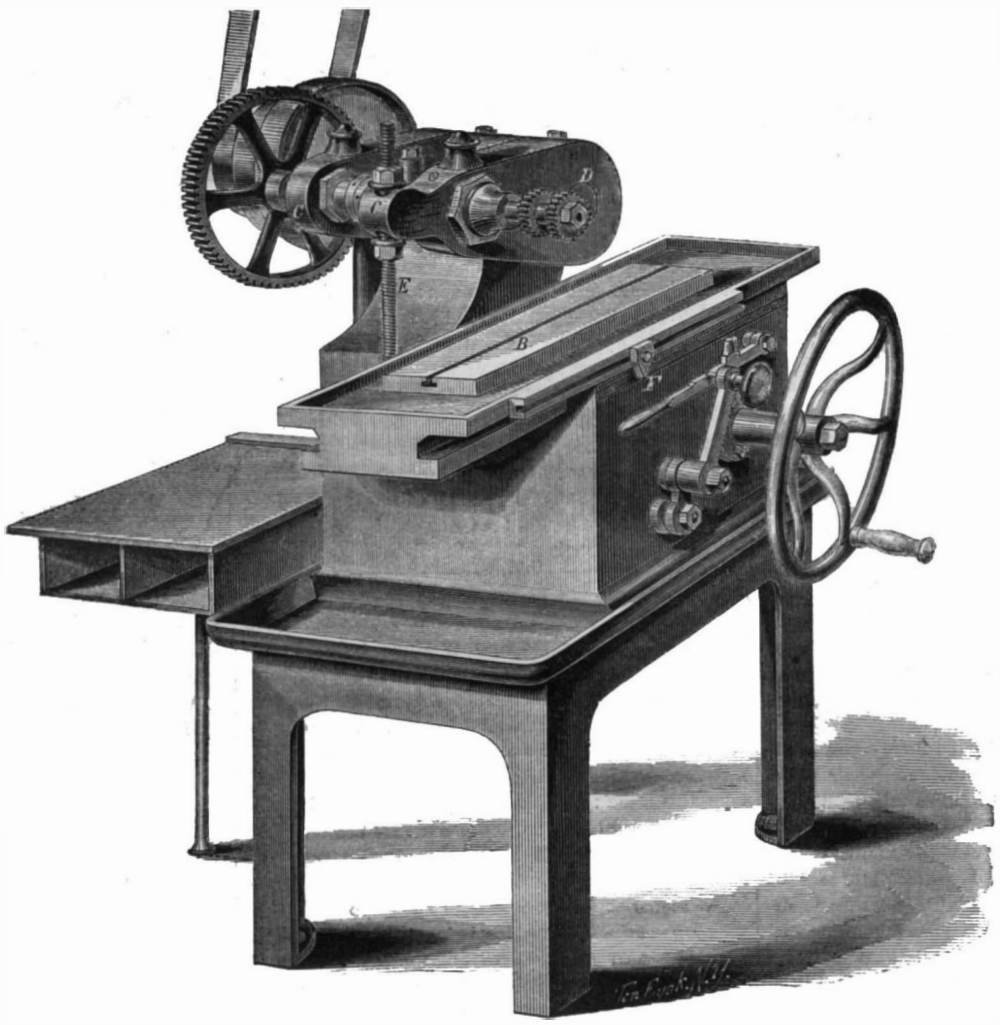
Improved Milling Machine.

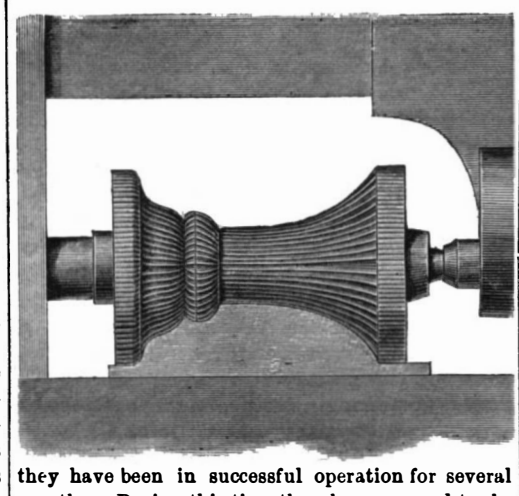
No more useful tool exists for certain kinds of machine work than the milling machine. It may be called an automatic worker in iron ; for to such perfection has it been brought by the efforts of ingenious men, that it is self-acting after being once started, ceasing to operate only when the task is completed. The machine herewith illustrated is one designed by the Providence Tool Company, and consists of a strong cast-iron frame, A, fitted with a bed-plate or table, B, on which the work is fastened. The mills and their machinery are carried in the ends of the arms, C, said arms being keyed on the shaft, D. This shaft is received by a bearing, the nuts only of which are shown in the engraving. It will be seen, therefore, that the arms can be moved up and down in a vertical direction, and thus adjusted with great facility. Provision is made for extreme nicety of adjustment in the screw, E, by means of the nuts, upon which the arm and the milling wheels or cutters can be graduated to the work with great accuracy and without loss of time, or altering the tension of the belt—a feature not usually obtained in machines of this class. This bolt also serves as a stay to the arm, and prevents chattering or vibration, thus securing very smooth work. The spindle on which the mills are fastened runs in a box with an anti-friction curve ; there are also check nuts which afford the means for lateral adjustment of the cutters and taking up the wear of the spindle. When designed for heavy work, an arm to hold a back center for the spindle, is bolted to the yoke. By this arrangement the spindle and back center always move together, by simply adjusting the two nuts upon the fixed screw, as described above.



THE PROVIDENCE TOOL COMPANY'S MILLING MACHINE.

The table is moved by a very simple feed motion, placed within the frame of the machine, and easily accessible through an opening in the rear of the bed. The stop, F, on the table comes in contact with the feed gear and throws it out when the work is done. This table is arranged with a pan to catch the oil and chips from the cutters. An oil pan is also cast with the bed of the machine, which prevents the drippings and refuse from soiling the floor. At the side of the machine is a cast-iron stand to hold the work to be milled, underneath which is a cast-iron box to contain waste and small tools. The small cut accompanying the machine represents one of the cutters or mills used with it. It has large cutting surfaces of greatly varying diameters ; but these all cut at once with great ease.

The above machines were designed and are built by the Providence Tool Company, at whose armory



they have been in successful operation for several months. During this time they have proved to be eliable and effective in every particuar. For further information address the Providence Tool Company at Providence, R. I.

The American Fur Trade.

Respecting the value of this important traffic, the St. Paul (Minn.) *Press* says :—"On looking at the books of our dealers, we find that 3500 bison or buffaloes have fallen victims to the arrow or the bullet on our Northwestern prairies, to supply civilized man with robes to keep him warm in the winter. These robes will always be a standing article for such purposes. They cost about $7 undressed. An equal number of wolves—which fact one hears with pleasure—have also bitten the dust to supply our fair countrywomen with elegant sleigh robes, worth $2 each, to keep out the biting air while gliding over the snows of the northern winters. The bruin family bewail the loss of 950 ursine members. These skins, costing from $10 to $20, are also used for sleigh covers and for military purposes, as are 1,050 of the red fox, worth about $2 50 each. The mink, now mercilessly pursued, since his pelt is worth from $3 50 to $5, contributes 28,000 skins toward those elegant mantles and cloaks that every lady covets. The muskrat species are prolific, and have given us fully 250,000 skins, worth 80 to 85 cents each. Of the more rare and costly furs, 2,258 otters have been captured from their lacustrine retreats, to do duty in the shape of gloves, &c., at $6 to $7 per pelt, and 540 "fishers" have been trapped, yielding the fortunate hunter $8 to $10 apiece. The marten family, one much prized, lost 1,600 members, enriching the trapper at the rate of $5 to $10 each. Of the cross fox, a very scarce and rare animal, only 76 have been caught. Good specimens bring $20.

During the winter a trapper brought in, among a lot of peltries, two skins which, as nothing had ever been seen here like them before, were called the blue fox. They seem to be a hybrid between the cross fox and the silver fox. No one knew their value, and they were sold at $2 each. The skins brought $25 each in New York city."

Extension of the Broad-gage Rail.

The Cleveland (Ohio) *Herald* of the 3d inst., gives a glowing account of the opening of the Atlantic and Great Western Railroad to that city on the previous day. It says :—"The closing link in the broad-gage line of the Atlantic and Great Western Railway was completed ; Cleveland and

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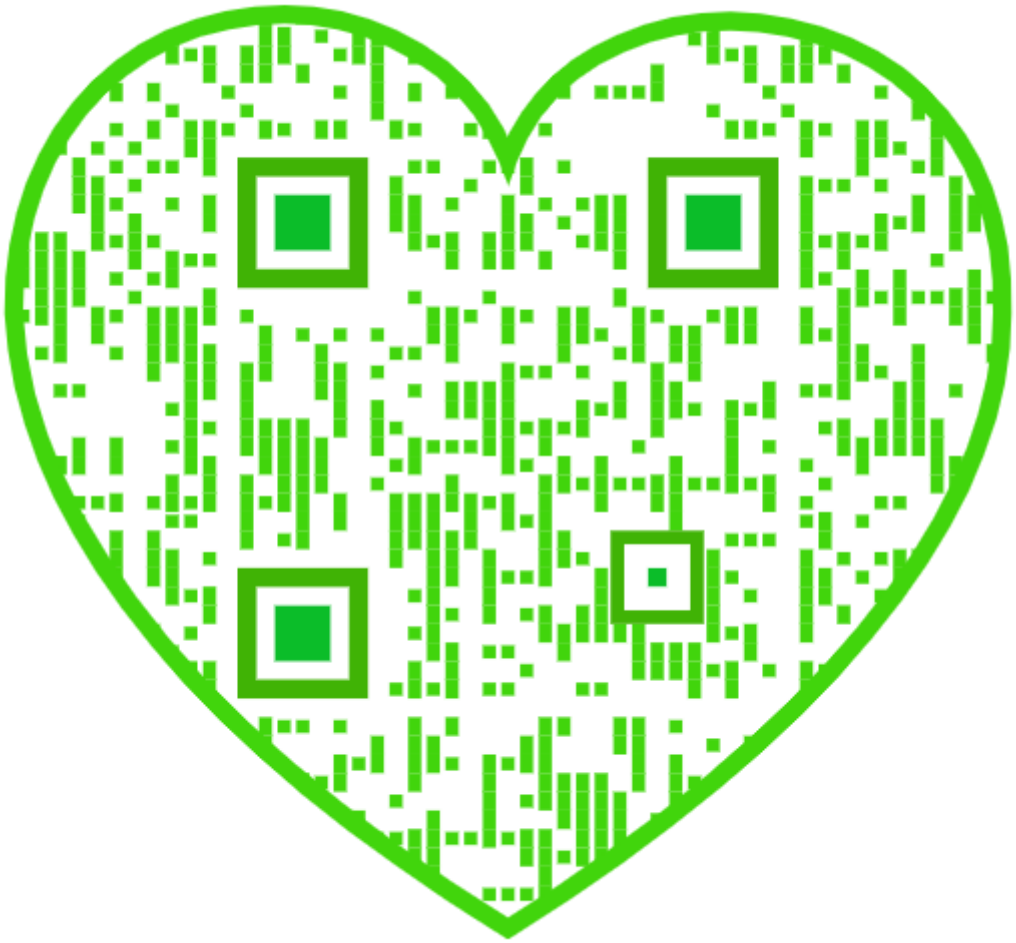

New York were placed in direct and unbroken communication with each other, and for the first time a train of cars, made up on the Long Dock, opposite New York, came through direct to Cleveland. This, we think, is an event of no ordinary importance. The train consisted of ten freight cars of the Atlantic and Great Western, and New York and Erie Railways, direct from Jersey City, and the elegant private car of T. W. Kennard, Esq., the general manager of the Atlantic and Great Western Railway.

NEW BOOKS AND PUBLICATIONS.

THE PRACTICAL SHEPHERD. Edited by Henry S. Randall, LL.D. Published by D. D. T. Moore, of Rochester, N. Y.

This is a neatly illustrated volume of 454 pages, upon a most important subject, by one who is in every respect competent for such a task. Descriptions are given of different herds of sheep and their peculiarities, with historical sketches of their introduction into the United States. The adaptation of different breeds to different localities is pointed out, with the best modes of management. The information contained in it is of a greatly varied character, and the book is really what it pretends to be "The Practical Shepherd."

Spanish merino sheep were the parent stock from which all the known fine-wool varieties have been derived. They abounded in Spain prior to the Christian era; their wool is celebrated for its felting properties, and excels for the manufacture of fine woolen fabrics. The first flock of them introduced into the United States was in 1802, by Col. Humphrey, Minister to Spain, and consisted of 21 rams and ewes; but in 1809, Mr. Jarvis, Consul at Lisbon, sent over 3850 of such sheep, which were the purchase of the confiscated flocks of Spanish nobles; and within a few years afterwards, about 5000 more were imported by other persons. For four years succeeding 1824, Saxony merinos were imported in large numbers, and in 1828 a mania seized the people for this class of fine wool sheep, and preference was given to them up till 1840, when a reaction took place in favor of the pure Spanish breed, which is far superior. Mr. Edwin Hammond, of Middlebury, Vt., seems to have been the most successful breeder of Spanish merinos in America; and they now surpass the parent stock in size, weight, and quality of fleece. His flock yields on an average 10 pounds of unwashed wool per head; they are double the size of Spanish sheep, and are both strong and hardy. Some small flocks of Silesian merinos are also of a superior character.

The English herds are celebrated for their size, and the superior quality of their mutton. Their wool, however, is coarse; yet it is long and lustrous, and very suitable for some fabrics. The Leicester, Cotswold, South Down, and some other herds, including the famous Bakewell, are celebrated for their mutton and heavy fleeces. Respecting mutton as food, Mr. Randall states that it is the favorite animal food from peer to peasant, in England; but until within thirty years very little mutton was consumed in the United States. He says:—"I can myself remember when it was rarely seen, and never habitually used on the table, except perhaps in cheap boarding-houses. This prejudice continued until the comparatively recent general introduction of the improved English mutton sheep, and until fashion in cities, for once, inaugurated a great and useful change in the public taste. Some of the earlier prejudices yet linger among the rural population. The first quality of mutton now commands a higher price in our markets than the first quality of beef." The extent of this change is given by the following incident:—"At Brighton (near Boston) on the market day previous to Christmas, 1839, two Franklin county men held 400 sheep—all in the market—and yet so inactive was the demand they finally sold with difficulty." Twenty years afterward—in the same place and on the day before Christmas 1859—five thousand four hundred sheep passed from the drover to the butcher. The history of Boston in this respect is but the history of all our larger towns and villages. Mutton is recommended to our farmers and people generally as being more healthy to be used in place of the large quantities of pork now consumed.

During the war with England in 1812, the price of choice lots of merino wool ran to $2 50 per pound, but within one year after the peace, a merino sheep would be purchased for one dollar. Mr. Randall, however, asserts that the raising of wool has not been unprofitable since 1824. In January of that year it was 70 cents per pound for fine, 45 for medium, and 33 for coarse. In 1844, it was 37 cents for fine, 31 for medium, 26 for coarse; but in the intermediate years it had fluctuated from 44 cents to 70 cents for fine qualities. In 1861, it was 47 cents for fine, 47 for medium, and 52 for coarse—a remarkable change—the fine being the cheapest and the coarse bringing the highest prices. This was owing to the great demand for coarse wool for strong heavy fabrics. At the present moment domestic wools are selling at from 68 to 82 cents per pound. No American woolen goods are exported; on the contrary we import large quantities of wool and woolen manufactures. In 1861, foreign wool valued at $4,717,350 was imported; and woolen goods valued at $28,487,166. During the past year the raising of wool has been a very profitable business, and it will probably continue so for many years to come, owing to the deficient supply of cotton, and the extended use of woolen flannels and other fabrics for which cotton was formerly preferred. In view of these facts it becomes vastly important that those who raise sheep should obtain all the information possible how best to manage their flocks, and we unhesitatingly recommend the "Practical Shepherd" as the most interesting and reliable work on the subject extant.

FINE WOOL SHEEP HUSBANDRY. Published by C. M. Saxton, this city.

This is a neat small volume by Henry S. Randall, being a paper read by him before the New York State Agricultural Society, Feb. 12, 1862. It also contains a valuable appendix of statistics relating to wool culture and import prices of fine wool. The origin of the merino breed of sheep is investigated, and as a historical production relating to fine-wooled sheep abroad and in America, it is a most interesting treatise. The work states that our people are consuming annually 20,000,000 pounds of foreign wool, all of which could be raised at home with 50,000,000 pounds of a surplus.

California Items.

TIN MINE.—The California *Farmer* states that a tin mine has been discovered near Mono Lake, by the Hank Schram Gold and Silver Mining Company. They were at work on a lode containing gold and silver, and by chance discovered the tin. The ore contains from 5 to 23 per cent of metal. The mine is 25 miles from Aurora. Wood and water are abundant near the mine: and the lode is from 60 to 100 feet thick, and has been traced more than a mile.

COPPER SMELTING.—It is stated by the editor of the Contra Costa *Gazette* that copper smelting works have been erected at Antioch, where the copper ore is to undergo a primary smelting before it is forwarded for exportation to places where it will be further refined. The *Gazette* says:—"It is not the intention of the proprietors of these works to do other than to reduce the ore here, and then ship it to Swansea for its final working."

COPPER IN SIERRA COUNTY.—The editor of the *Mountain Messenger* states that he had recently visited the copper fields of Gibsonville and says:—"The only company organized and at work is the Gray Eagle, whose ledge is located at Mount Pleasant, Gibsonville. Their shaft was down 56 feet, and is on the lode, showing a vein of nearly solid mineral, from 5 to 6 inches in thickness, which is increasing. The ore is very fine grained and supposed to be rich in sulphurets of copper, with a mixture of silver. Nearer the surface the ore possesses a yellow hue, somewhat resembling bell metal. The croppings of the Newark ledge, which crosses the ravine just above Gettig & Shoeman's store, are decomposed talc, or soft bed-rock, such as is readily worked with the pick without blasting. It contains a bronze like deposit of native copper, disseminated through the rock in delicate sheets and fine particles. Ounce nuggets of pure copper have been repeatedly found in the hydraulic diggings crossed by this ledge."

PACIFIC COD FISH.—The fishing brig *Timandra* recently arrived at San Francisco with a cargo of cod fish taken on the Russian Asiatic coast, northern Pacific Ocean. The fish are of the same species as those taken on the Grand Banks of Newfoundland. They were not dried, being merely pickled, and of small size but good quality. It is expected that a profitable cod fishery will be established in that sea, as the fishing district is extensive; especially as California, Oregon and Nevada, consume about 400 tuns of such fish annually, all of which are imported from the Atlantic.

TOBACCO.—Californians have commenced the cultivation of tobacco with great promise of success. The Contra Costa *Gazette* states that ten acres of the best has been raised in that vicinity this year, equal in aroma to the best Virginian. The whole of the crop referred to sold at an average price of 16 cents per pound.

COAL.—A new seam of coal has been discovered at Cloverdale, Sonoma county, about four feet under the surface. It is now being mined, and is found to be a very pure bituminous coal, suitable for blacksmith's forges, and equal to the coal of Mount Diablo for every purpose. Thus far the coal found in California has been of limited extent; the seams being almost like intrusive formations. An abundant supply of cheap coal would make California a great manufacturing and commercial State.

GOLD.—The San Francisco *Mercantile Gazette and Prices Current* says:—"As a sample of tall figuring, we observe that the Virginia *Bulletin* estimates the annual yield of bullion in Nevada Territory at $730,000,000. The *Enterprise* reduces the figure to $30,000,000. Both declare that figures won't lie. These wild estimates will be coming back to us soon in Eastern papers and magazines as reliable and authentic statements. Congress at its last session was informed officially that the yearly product of Nevada was $24,000,000 or thereabouts. It has probably never yet reached $12,000,000 per annum, but may probably do so during the current year, and will doubtless increase largely in the next. The exports of gold for England are much larger than for New York. The total to all parts of the world, from January 1st to September 22nd was $31,956,500; for the same period in 1862 $28,356,738, being an increase of $3,599,768. Government securities are firm; the demand of money for mercantile purposes light, and a large accumulating amount of capital is seeking investment.

Performance of American Steamships.

That splendid vessel, the *Golden City*, recently built by W. H. Webb, has made a remarkable voyage to California: an account of the trip is given below. The *Golden City* has a beam engine of 105 inches diameter of cylinder and 12 feet stroke of piston, built at the Novelty Iron Works.

This new steamer arrived at Panama direct from Rio (not touching, as usual, to coal at Lota), October 24, in 41 days, 15 hours, running time from Canal street wharf, New York; whole distance 11,166 miles. The greater part of the Atlantic voyage she experienced head winds with heavy seas. From the Straits to Panama she averaged 305 miles a day, and for the whole voyage 268 miles a day.

Captain Eldridge writes from Panama:—

"The engines are in perfect order and work better than when we left New York; and, in fact, the ship is about as near perfect for her intended trade as a ship can be: is now in perfect order, and could go to sea as soon as the fires could be lighted and steam raised."

From Rio he writes, September 30:—

"The Emperor, Empress, and suite, accompanied by the American Minister, visited the ship, and were received with a salute of 21 guns.

"The Emperor looked at every part of the steamer, and as we had steam up, I offered to give him a sail around the harbor, which he said he would like very much, as he wished to see that enormous engine in motion, after which he took leave, expressing himself much pleased, and we proceeded on our voyage."

OVER-REACHING.—To prevent horses over-reaching in traveling, a writer in the *Rural New Yorker* says, let the blacksmith make the "heel corks of the fore shoes high and the toe corks low; and the toe corks of the hind shoes high and the heel corks low." An infallible remedy.

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Trial of Armor Plates, Steel Guns, &c, at St. Petersburgh.

On Wednesday, the 17th of October, N. S., further trials took place at St. Petersburgh with the experimental 19-inch rifled cast-steel gun. The London *Times* states that this gun is of solid cast-steel, made by Krupp, and throws a 300-pound shell or a 450-pound solid shot. The results of previous experiments with this gun led the Russian Government to order 50 of them, which are now in course of delivery. The principal objects of the experiments on the 7th inst. were to ascertain the best description of shell, and to test the quality of armor plates supplied by Messrs. John Brown & Co., of Sheffield.

First, a series of cast-iron shells, 300 pounds each, were fired at different ranges, and then shells made by Krupp were fired at the 4½ inch armor plates. The first shell, of hard cast-steel, was 22¼ inches long (two and a half diameters), with a flat end 4 inches in diameter. Fired with 50 pounds of powder at 700 feet distance, it passed through the plate, oak and teak backing, and broke into many pieces, although filled with sand only. The second and third shells were also of Krupp's steel, the same length, but with 6½-inch ends. These shells pierced plates, wood, &c., and also went to pieces, although only filled with sand. The fourth shell was made by M. Poteleff, of puddled steel, on Aboukoff's system, the same dimensions as the second and third, and went through iron, teak, &c., but was only bulged up from 9 inches to 12 inches, and the end flattened; not a single crack being visible in the shell. The fifth shell, the same as the fourth, passed through iron, teak, and the second target, and went at least a mile beyond. The sixth and seventh were from Krupp, and were charged with powder; they were quite flat-ended, 9 inches in diameter. One exploded in the plate, the other in the wood. The eighth and ninth shells were of cast-iron, and, although they passed through the plates, were of course destroyed. Evening prevented further trials, which will yet be made on the same plate.

The results on the plate were highly satisfactory. In a space of 4 feet 6 inches by 3 feet 6 inches, eight holes were made without any crack of the slightest description; and the marine officers present were highly satisfied, because they are obtaining 4,000 tuns of plates from Messrs. John Brown & Co. for their different ships.

Cast-steel guns are decidedly before any yet produced in England of any other metal. The 9-inch gun of Krupp has been fired with 300-pound shells and 50 pounds of powder, about 70 times, without any flaw; and the Russian Government will shortly be in a position to obtain in St. Petersburgh a large supply of cast-steel guns, made from Russian iron, by Russians, on Aboukoff's system, which is very nearly the same as Krupp's.—*London Engineer.*

Grain Produce at Chicago.

The receipts of flour and grain at Chicago during the past two months have been enormous—amounting to 6,987,491 bushels wheat—showing an increase over the receipts during the same time last year of 1,097,428 bushels. The receipts of corn show a large decrease, the entire receipts for September and October being only 3,917,513 bushels, against 7,630,042 bushels last year. This decrease is the result of the early frost, but does not fairly represent the extent of damage, we think; as the growers have held back their supplies for higher prices, which is usually the case in times of excitement in the market, when prices rapidly advance.

There are no shipments of grain from New York to Europe on war orders, because prices are lower on the other side of the Atlantic than they are here.

Finances of California.

California has an area of 188,892 square miles, and in 1860 contained 379,994 inhabitants, showing a density of 2 01 persons to the square mile.

The private wealth in the State in 1862 amounted to $160,369,072, of which $80,735,855 represented real estate, and $72,647,666 personal property. This ives $422 03 to each inhabitant.

The amount of taxes levied on property in 1862 amounted to $3,673,129, of which $1,221,064, was for State purposes (including federal tax), being 77 cents per $100 valuation, and $2,453,065 for county purposes. The State tax averaged $3 21 to each inhabitant.

The receipts of the State Treasury from all sources in 1862 amounted to $1 031,529, and the expenditures for the same year to $1,146,744. The expenditures were equal to $3 02 to each inhabitant. The debt of the State amounts to $5,569,284.

Driving Wheels of Locomotives.

In an article on the driving wheels of locomotives, the London *Mechanics' Magazine* says:—"Speed really depends on boiler power, and the rapid reciprocation of the pistons is no real evil. Theoretically objectionable, practice proves, in the clearest manner, that working expenses are not increased by it to any appreciable extent. Immense driving wheels no longer enjoy the popularity they once did; and we much doubt that any engines are now being built with them. Indicator diagrams taken from an express engine, with seven feet two inch drivers, at a speed of 63 miles per hour, are almost identical with those taken from a nearly similar engine, with drivers a foot higher, at 60 miles per hour. The indicator is, after all, the real test of the good qualities of a locomotive, as far as the action of steam is concerned; and we regard such a result as pretty conclusive that nothing is to be gained by the use of a wheel much over nine feet in diameter. A rapid reciprocation of the pistons permits the use of a large blast-pipe, as the blast in the chimney is equalized and rendered more effective, while it does not cut up the fire so much as an exhaust at comparatively distant intervals. Regard the matter as we may, we believe that there is no difficulty in proving that the most efficient engines ever built have had driving wheels of moderate diameter; and railway companies will find it good policy to return to their use."

Patterns by Post.

Patterns of merchandise may now be transmitted by post between any places in Great Britain, at the following rates of postage, which must in all cases be pre-paid by means of postage stamps, namely: for a packet weighing not more than 4 oz., 3d.; more than 4 oz. but not more than 8 oz, 6d.; more than 8 oz., but not more than 16 oz, 1s.; more than 16 oz., but not more than 24 oz, 1s. 6d. No packet of patterns must exceed 24 oz in weight; exceeding that weight, it will be treated and charged as a letter. The pattern must not be of intrinsic value. This rule excludes all articles of a saleable nature, and indeed whatever may have a value of its own, apart from its mere use as a pattern; and the quantity of any material, sent ostensibly as a pattern, must not be so great that it can fairly be considered as having, on this ground, an intrinsic value. Samples of seeds, drugs, &c., which cannot be sent in open covers, may be inclosed in bags of linen, or other material, tied at the neck. One rule forbids the transmission, through the post, of any article likely to injure the contents of the mail bags.

MISCELLANEOUS SUMMARY.

Small Turbine Wheels in Cities.—In Manchester, England, Mr. Schiele is building some turbine water-wheels of only a few inches diameter, which are driven by the water in the pipes that supply the city. These small wheels are employed to drive fans, the bellows of organs, sewing machines, &c., and wherever there is a sufficient pressure of water in any city, they may be thus used with great economy. As convenient small motors, nothing can excel them, as they can be set in motion and stopped as easily as gas can be let on and off in the supply pipes.

The fisheries about Sandusky and the islands are reported as yielding immensely this fall. The run of white fish is large, and the quality excellent. Large quantities of these fish are being packed at Sandusky, to supply the demand from all parts of the country.

A mine of magnetic iron has been opened in Sweden, several feet thick, which causes a deviation of the needle of from ten to fifteen degrees. Natural magnets of 4 cwt., will soon, says a Copenhagen letter, be no rarity in commerce.

The total of natives of European continental states residing in London is 37,955.

British Army Recruits.—The following is an account of the occupations of British recruits, and the amount of education they received before entering the army. We find that 9,420 were laborers, husbandmen, and servants, 2,783 manufacturing artizans, 4,863 mechanics, 2,051 shopmen and clerks, 108 professional men or students, and 142 boys enlisted as drummers. Ireland furnishes much above the average proportion of laborers; Scotland, of manufacturing artizans and mechanics; and England, of shopmen and clerks. Of every 1,000 English recruits, 247 were unable to read or write, 51 could read only, and 702 could both read and write. Of every 1,000 Scotch recruits, 163 could neither read nor write, 156 could read only, and 681 could both read and write. Of every 1,000 Irish recruits, 321 could neither read nor write, 145 could read only, and 534 could both read and write.

An Italian Recipe for Making Wine.—An American having written to a friend in Italy for instructions as to making wine; received the following broken English reply:—

"The way to make wine with grapes is to stomp well them in a tob with a hol and spicket in the bottum, and put that juse in a barel where has ben wine or whiskey or liquors of some kind, otherwise the wine will stink of wood. Let them boil for forty days meanwhile making the barel full every day for in the boiling diminish. Shot up it after the forty days, and longer you let him stay older it comes and better it will be."

The word "boil" means in this case, "ferment." The rest is intelligible, and those who follow the receipt faithfully will find it a good one.

New Mode of Preserving Provisions.—A patent has been applied for by A. H. Remond, of London, for preserving provisions by passing a current of electricity through the cans or cases containing what are called "preserved provisions," after they are sealed up. The electric fluid is made to pass through the case on a fine iron wire; the wire is caused to become red hot by the intensity of the current, and thus the oxygen in the can is said to be consumed, because it will unite with the hot iron wire and form an oxide.

The Newport (Vt.) *News* says one of the most distinguished geologists of New England has just made a very favorable report on the lead mines along the shore of Lake Memphremagog, Vt. The mines are represented as property of great value, and steps will be immediately taken to work them.

Joking.—Never risk a joke, even the least offensive in its nature, with a stranger or a person who is not well bred and possessed of sense to comprehend it. By heeding this advice you will save yourself mortification and pain.

A flax cotton mill is fitted up at East Toledo, Ohio, which is expected to consume 4,900 pounds daily of raw material, and produce 2,000 pounds of cotton-ized flax. Eastern satinet manufacturers have agreed to take it all.

Skating.—Ice formed in the mill ponds of this village during the night of Thursday; Oct. 29th, two or three inches thick, and our young people had a lively time skating in the early part of the next day. —*Coos (N. H) Republican.*

In Collinsville, at the Collins company's works, with Edward Lang for helper, L. T. Richardson made from the bar 10,000 bayonet blades in October, and challenges any man to beat it.

The number of fire-arms manufactured at Colt's armory in Hartford, during October, averaged one a minute through ten hours of each day in the week, Sundays excepted.

Correction.

In setting up the description of an "Improved Quartz Mill," on page 305, current volume, an omission occurred which changed the sense of the text: "a simple wheel, turning on its axle and driven by animal power"—should read: "a simple wheel, traveling around in an annular trough, turning on or driven by its axle by animal power; after many years one more wheel was added—thus making what is known as the Chilian Mill," &c.

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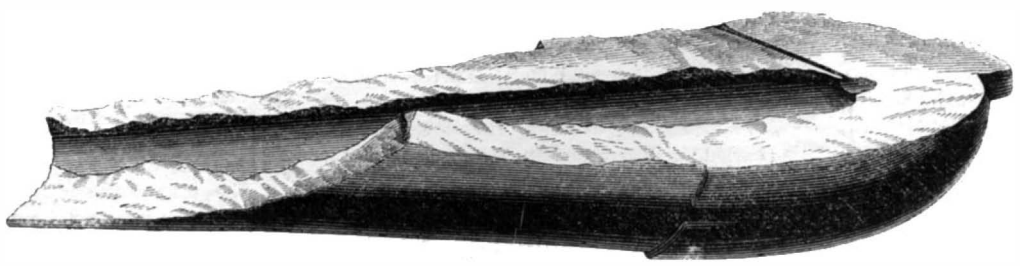
EXPLODED GUN.

The accompanying figure is a view of a portion of a large gun which was exploded at the Builders Iron Works, Providence, R. I. Seeing this gun lying on the premises, a sketch was taken of it, and in connection therewith we present some facts of general interest. It was a 13-inch gun, cast solid; its weight we were told was 25 tuns, length 14 feet, and the thickness of metal across the butt was 44 inches, and 5½ inches thick at chase. It was fired 178 times with 50 lb. charges of powder, and solid shot weighing 276 lbs. each. It will be noticed that it is split longitudinally and portions of the ragged edge indicate a good quality of metal. We were told that the rent first commenced at the small thimble recess at the breech, and it was fired several times after this was first observed. What good purpose this recess can serve is not obvious. In other cases when large guns have exploded, the chase has been riven entirely from the breech part and thrown over end. In the above figure, the split is lengthwise, dividing the gun into two parts. It is probable that this gun would have shown greater endurance had it been cast with a core and cooled in the interior upon the Rodman principle. We are aware that a contrary opinion exists among many persons who have given attention to this subject; but experiments with hollow cast guns go to prove that they are stronger than those which are cast solid and cooled from the exterior.



Iodine.

The following is condensed from the *Chemist* (London), from an article by C. W. Quin, F. C. S.:—

"Iodine is an elementary body that crystallizes in bluish-black scales with a metallic luster, fuses at 225° Fah., and boils at 347° Fah. Its odor is similar to that of chlorine; and when it is sublimed it yields a violet-colored vapor. It was discovered by M. Courtois, a French manufacturer of saltpeter, in Paris. By adding some sulphuric acid to the mother liquors of sea-water, he noticed that a beautiful violet vapor arose when heat was applied. At the same time he was struck with the rapid corrosion of the iron vessels which he had been using. On carefully examining the residues in the boilers, he obtained a peculiar substance, crystallizing in grey plates, having a metallic appearance. This crystalline material, on being submitted to the action of heat, gave forth the violet vapor he had at first obtained. Although a man of great sagacity and high scientific attainments, M. Courtois hardly felt himself strong enough to pursue his investigations into the properties of this new substance, which he rightly conceived to be an element. He accordingly communicated his discovery to M. Clement, an eminent chemist of the day, who at once set about investigating the nature of the new body; and a few weeks after, the celebrated Gay-Lussac read a paper before the French Academy of Sciences, in which he demonstrated that the new substance was an element similar to chlorine, and gave an account of its most interesting properties. Some days after, Sir Humphrey Davy, who happened to be in Paris at the time, read another paper on the new element before the same august body, agreeing in the conclusions arrived at by his eminent colleague, and showing the important bearing that this discovery had on his theory of the elementary nature of chlorine, which he was then engaged in working out. It was not, however, until 1819, some six years after its discovery, that iodine was first employed in pharmacy. The merit of the introduction of this powerful curative agent into medicine is due to Dr. Coindet, a physician of Geneva, who in that year commenced a series of experiments upon it as a remedy for bronchocele or goitre, a malady unfortunately only too common in the mountainous districts of Switzerland. Dr. Coindet was first prompted to try iodine and its compounds in bronchocele by the experience he had had of the efficacy of burnt sponge and the ashes of *Fucus vesiculosus* in this disorder. Knowing that both of these medicaments contained certain proportions of iodine, he rightly conjectured that it was to the presence of this element that they owed their powerful curative properties. The exhibition of it was at first strenuously opposed by the faculty of Europe, who were naturally averse to using what they knew to be a powerfully corrosive poison; but the successful results obtained by Dr. Coindet at Geneva, and other eminent men in different parts of Europe, soon brought it into general use. Dr. Manson, an English physician, first employed it on an extensive scale in scrofulous diseases. In large doses given internally, iodine acts as a very energetic irritant poison; in smaller and continuous doses, it exercises a general stimulative action, more particularly on the pulmonary and gastro-intestinal mucous membranes. Its salts are largely employed for their alterative effects in scrofula, cancer, syphilis, and other disorders of a similar nature. Applied externally, it acts as a vesicant and discutient, staining the skin brown or orange, and causing itching and redness. Used as an ointment, it is absorbed, producing its characteristic effects. Inhaled, its vapor exercises an alterative action on the mucous membranes of the respiratory organs, which has been found very beneficial in cases of pulmonary phthisis. The principal officinal preparations are the tincture, consisting of iodine dissolved in alcohol; the compound tincture, iodine dissolved in a solution of iodide of potassium; iodide of potassium, the most used of any of its salts; iodide of sodium, which acts more energetically than the last, from containing eighty-five instead of only seventy-six per cent. of iodine; iodide of ammonium, which is more energetic than either, from being more easily decomposed; the iodides of calcium and barium, used as alteratives in scrofula; the iodides of lead and cadmium, employed in ointments in indolent scrofulous aud syphilitic tumors; iodide of silver, in syphilis; iodide of sulphur, as an ointment in obstinate skin diseases; iodide of iron, which possesses the properties of both elements, and is much prescribed in scrofulous diseases of anæmic patients; and the green, yellow, and red iodides of mercury. Donovan's solution, a famous American remedy in syphilitic disorders, is composed of the iodides of arsenic and mercury in equal proportions. The iodide of quinine has been occasionally prescribed. *Iodoform* is also employed in scrofulous affections: it contains nine-tenths of its weight of iodine, notwithstanding which its taste is mild. The first step in the manufacture is the rough iodine, which is produced from kelp or burnt seaweed. The various species of *Fucus* and *Ulva* thrown on the coasts of Scotland, Ireland, Guernsey, and Brittany by the waves of the Atlantic Ocean, contain the largest quantities of this valuable element; the richest weed yielding from eight to fourteen pounds per tun, while the poorest realizes no more than four or five pounds in the same amount. The principal manufacturers of rough iodine are Messrs. Paterson, Smith & Ward, of Glasgow; Hughes, of Ireland; Tissier aîné et fils, and Cournerie & Co., of Cherbourg, Normandy. The annual amount of iodine produced in Scotland and Ireland is very great, a large proportion being exported to France and America. The refined iodine mixtures are manufactured upon an extensive scale by Huskisson & Sons, Chemists, London.

A COAL OIL QUARRY.—At Santa Cruz, in California, there are over a thousand acres covered with a substance resembling asphaltum, from one to ten feet thick, which is in reality a species of petroleum, easily melted, and susceptible of being purified and refined into excellent burning fluid.

Stables for Farm Horses.

The following on stables is condensed from the *Journal of the Royal Agricultural Society* of England, being part of an able essay on the subject of the breeding and care of horses:—

"The stable should not be less than eighteen feet wide, and of such a length as will allow a six-feet standing for each horse, and ten feet high. The horses stand in a single row, and the barness is hung on pegs in the wall behind them. This width admits of thorough ventilation to the stable, without subjecting the horses to draughts. Each standing should be parted off by an upright post reaching from the ground to the ceiling rafter, placed three feet off from the wall at the horse's head. These partitions should be closely boarded up three feet above the manger and hay crib, to prevent the horses quarrelling about the food, and kicking each other. To each of these posts a bale, eight feet long and one foot eight inches wide, should be hung by a strong chain, to divide the standings, and suspended by another strong chain at the hinder end from the ceiling rafter. Each chain should have a hook and eye within reach, that may be readily unfastened. This arrangement will leave a space of six feet opposite the head of each horse, available for feeding purposes. The manger for corn and chaff may be made two feet six inches long. It should be two feet wide at the top; one foot two inches at the bottom. The hay and straw, which should be cut into six-inch lengths, will require a larger receptacle, which should be three feet six inches long, two feet wide at its upper part, and half that width below.

"At the top of this hay and straw crib, an iron rack with bars six inches apart should be so hung as to open up and fall back against the wall to let the fodder be put in, and then be put down upon it for the horse to eat through. It should be so much smaller than the opening that it can fall down with the fodder as it is consumed, by which means not a particle is wasted. The top of the front and ends should be covered with half-round iron, 2½ inches wide, screwed on to project over the front outside a quarter of an inch, and three-quarters of an inch inside the manger. This prevents the food being tossed out, and the manger being gnawed. A short post must be put as near the center of the standing as possible to support the manger, into which a large screw ring must be put to let the chain or rope of the headstall pass freely up and down without constant friction. The manger may be three feet six inches from the ground to the top; the hay crib of course the same hight.

"The flooring of the standings three feet six inches from the head, should be flat, then with a fall from both sides to the center, where a drain of four inches wide, with a removable flat cover fitted to the inside of it, should be placed straight down the standing, with a fall into another larger cross main drain 10 feet 6 inches from the head, so placed as to carry away the urine from all the smaller drains into a tank outside the stable.

"The ventilation is the most important feature in the construction of the stable; upon it depends the health of all the horses, and consequently their usefulness. No stable should be without a constant change of air, and no horse in it should feel the draught. The two ends of the stable may be so contrived as to effect this object in this manner. Take twelve feet from the head wall to the opening for the stable door; allow eight inches for the two door-posts, and four feet six inches from the door. This will leave ten inches between the door-post farthest from the horses and the back wall. This space, from the ground to the top of the door, should be left open, and covered with strong rabbit wirework, which should be permanently fixed. The door should be seven feet high, and cut into two parts horizontally, at a hight of four feet. The lower part may be kept shut while the horses are in; the upper three feet may be open or shut, according to the state of the atmosphere. Plenty of light should be admit-

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ted from the hinder wall by narrow fixed windows made of slabs of strong glass, never to be opened. Windows opening in bad directions, and open skylights, kill horses by wholesale. The arrangement described is suited for ten horses.

"It is important that the water which horses drink should be exposed to the atmosphere at least six hours before they are allowed to have it; and they should never be allowed to drink till they have eaten something. The colic is almost always occasioned by their taking large quantities of cold water into empty stomachs.

"The temperature of the cart-horse stable should be as little above the external air as may be, to keep the inmates comfortably warm. The working cart-horse, when turned out to grass in the summer, may have in the stable 8 or 10 pounds of bruised oats, mixed with a little hay and straw cut together into chaff. In the winter time he will consume, entirely in the stable, of bruised oats, 10 pounds; of hay and straw cut together, 7 pounds each; of cut roots, 28 pounds, given with the oats and chaff. When roots cannot be had, 1 pound of dry bran to each horse per day may be used instead. The disease called greasy heels in horses is caused by washing their feet at night and not thoroughly drying them afterwards. They should not be washed, but wiped down clean."

English Iron-Clads.

Descriptions generally are very tedious reading, but we deem our record of foreign iron-clads incomplete without the addition of the latest English naval vessel of this class—the *Valiant*—to the list. The London *Engineer* has the following account of the ship:—

"The *Valiant* is one of quite a new class of iron frigates—a connecting link, so to speak, between the magnificent *Warrior*, and the ugly, but useful vessels of the *Defence* and *Resistance* class. Her length over all is 280 feet, her extreme breadth 56 feet, and her depth from her spar deck 39 feet. Her lines are infinitely finer than the broad-bowed vessels like the *Defence*, but yet are not to be compared in fineness to the *Warrior*; while, on the other hand, her bows, without having a regular beak to be used as a ram, are still sufficiently projecting beneath the water-line to enable her, if she got a chance of striking an enemy, to inflict fearful mischief, without in the least risking the safety of her own hull. She is, in fact, sister ship to the *Hector*, which was launched from the Clyde at the close of last year. In the construction of the hull the principle is the same as that of all the iron frigates—that is to say, the *Valiant*, within her armor of teak and iron, is a perfect web of wrought-iron ribs and longitudinal girders. Like the new frigates, however, she is to be plated from stem to stern in armor, the stern being almost as fine as her bows, and with an additional plating of iron over her outer stern-post and rudder-head. About 80 feet from the bows inboard she is fitted with a semi-circular shield, which extends from one side of the vessel to the other, and rises from the main deck to the level of her bulwarks on the spar deck. This is coated with 4½-inch armor plates, and lined with teak as with the broadside. On the main deck it is closed, but on the upper is pierced for two of the heaviest guns for use in chasing an enemy, or when bearing down on one to strike her as a ram.

"It is intended that the *Valiant* shall be fitted with a pair of horizontal engines, of 800 horses nominal power, on the double piston-rod principle, manufactured by Messrs. Maudslay. The cylinders are each to be 82-inch diameter, with a stroke of 4 feet. They will both be surrounded with steam jackets, which are supplied with steam direct from the boilers; the ends of the cylinders and the cylinder covers are also to be cast hollow, and supplied with steam in the same manner. The screw propeller is 20 feet diameter, with two blades, constructed so that the pitch can be varied from 22 feet 6 inches to 27 feet 6 inches. When working full power the engines are expected to make about sixty revolutions per minute. There will be six boilers placed, three on either side of the vessel, with the stoking-room between them.

"There will be also a pair of auxiliary engines of the collective power of 40-horses, to work two double-acting force pumps, arranged with a system of pipes throughout the vessel for the purpose of extinguishing fire. These engines will be also used for driving two fans for ventilating the cabins by means of two lines of pipes, ranged one on either side, throughout the length of the vessel, with gratings for regulating the supply of air into each compartment. These engines will also be used for driving a blast fan for a cupola furnace, for melting iron for shells, placed at the end of the stoke-hole, and for driving an apparatus for raising the ashes on to the upper deck, so as to save labor. Externally the *Valiant* looks as ugly as the *Hector*, though better in the water than either the *Resistance* or *Defence*. About 400 tuns of her armor plates are already bolted on, and the others, manufactured at Messrs. Browns' works, Sheffield, are ready for fastening."

How Washing is done in Paris.

From sheer curiosity just follow my "washing" in its perambulations through the city. A young girl takes it from my room and carries it to the establishment of her mistress. Here every article is marked with a bit of thread. Thence it travels to the river, at the dirtiest portion of it, where the city sewers disembogue their foul contents. At this delightfully selected spot are large houses, built on boat-shaped foundations, two hundred feet long or more, two stories in hight, and provided with windows, chimneys, and other conveniences, like common dwellings on the land. The lower story floor is nearly even with the water's edge, and open to the air. On this platform are to be seen some hundred or two women in each of these establishments engaged in cleansing linen.

One should never allow himself even for a moment to imagine that the chattel is his own, which he observes undergoing the torture of purification; the consequences would assuredly be fatal to his peace of mind. When a man beholds his house burning up, he is in some sort reconciled to his misfortunes by witnessing the manly efforts put forth by generous firemen to rescue his property. But he is reduced to positive despair when he views the wanton exertions made to annihilate his nice shirts, and without any apparent compunction of conscience. But labor is cheaper than soap, and therefore it is used with greater freedom. Economy is duly attended to; but it is the economy of soap and not of linen. Fuel, as well as soap, is so dear that no one ever thinks of boiling the "white things," as in the United States. In the place of the former they use *l'eau de javelle*, which is nothing more or less than lye, and so strong as to flay the hand which touches it. This is applied without mercy.

After this corrosive ablution, they are pounded with a wooden hammer till every button on the shirt is broken, a signal that they have been beaten enough. The poor victim is not yet entirely dispatched; there are still some remains of vigor left. This is soon dissipated, for it is next laid on a board, and a brush of stiff bristles is energetically applied by a lusty woman. It is then rinsed in the yellow river, conveyed to a room overhead, and dried, returned to the first hands to be starched and ironed, and in a few days the bundle of rags is brought home to the unconscious proprietor, who pays about six sous for the transformation, and consigns it to the paper maker. Two sous are charged apiece for a similar conversion of collars, handkerchiefs and hose. The consequence of all this is, that dirty shirts are so excessively numerous as to become almost distinctive in a gentleman. To mark them with indelible ink is perfectly useless; after such a process even Kidder's is not invincible.—*Exchange.*

How to Cure a Smoky Chimney.—"I have just succeeded," says Mr. C. Butler-Clough, in the *Mining Journal*, "in curing an obstinate smoky chimney by the aid of a zinc covering outside a common earthenware chimney pot, having two openings in the zinc, one east and the other west. There are also two partitions or stoppers, north and south, to prevent the draught from escaping by the opposite opening. By the aid of this contrivance an upward current of air is carried outside the flue to its top, on the windward side of the chimney. I have now had the plan in use for some time, and in the face of several most violent storms not a particle of smoke or soot has come down the flue. In other rooms, the soot was blown on the floor to a large extent."

Coal and Iron Product.

The *American Gazette*, Philadelphia, states that there has been an increase in the quantity of coal mined this year of 1,585,700 tuns, up to the month of October, compared with the same period of 1862, and the total product of anthracite this year will reach 9,800,000 tuns. And yet with all this increase the price of coal in New York is about double that which ruled three years ago, and about one-fourth higher than it was last year.

With respect to the iron product, the *Gazette* says:—"The production of iron it is not so easy to state accurately. The Board of Trade of this city state the product in 1862 to have been 381,448 tuns in Eastern Pennsylvania, against 313,000 tuns in 1860—an increase of over 20 per cent. At the close of 1862, a large number of new works were started, and old ones were revived. In the Adirondack, in Massachusetts, in Ohio, and in Western Pennsylvania, every dormant establishment has been started in full vigor. Of Eastern Pennsylvania we know more definitely, and can safely estimate the aggregate at near 500,000 tuns, and the increase over 1862 at 20 per cent., while in other parts of the loyal States the increase is probably 25 per cent. In 1862 the Lake Superior region sent out $12,000,000 worth of copper and iron; of iron, pig and ore, 150,000 tuns; and of copper 9,300 tuns. In 1860 the production was double that of 1859, yet less than 120,000 tuns of iron and iron ore, and in 1861 but little more than half the aggregate of 1862. The reports already made of the business of 1863, sufficiently show that both copper and iron from this region will be largely in excess of 1862."

A Prophecy in Jest.

The following extract from a burlesque article in the *New Monthly Magazine* for 1821 (Vol. II.), entitled "Specimens of a Prospective Newpaper, A.D., 4796," is curious:—"The army of the Northern States (of America) will take the field against that of the Southern provinces early next spring. The principal Northern force will consist of 1,490,000 picked troops. Gen. Congreve's new mechanical cannon was tried last week at the siege of Georgia. It discharged in one hour 1,120 balls, each weighing five hundred weight. The distance of the objects fired at was eleven miles, and so perfect was the engine that the whole of these balls were lodged in a space of twenty feet square." A subsequent article in this specimen states that, "by means of a new invention Dr. Clark crossed the Atlantic in seven days." How little did the writer anticipate that in forty years these, to him, wild fancies, would be almost realized.

Electrical Phenomena in the Alps.

A party consisting of three Englishmen and a lady, with two guides, endeavored to make the ascent of the Alps on the 10th of July last, but when they had proceeded some distance they were prevented by a storm, during which they got into the middle of an electric cloud. Their hair emitted a hissing crackling sound, as if it had been under the influence of a powerful electrical machine, and over their faces and bodies they experienced a pricking, burning sensation. There were peals of thunder heard, at each of which the party received an electric shock, but no lightning was seen. The right arm of one of the party was paralyzed for several minutes; the snow emitted hissing sounds; the veil worn by the lady stood straight out, as also did the hair of all of them; which looked so ludicrous that they could not help bursting into laughter. This phenomena lasted for about twenty-five minutes, and no evil effects were felt afterwards.

To Prevent the Transmission of Sound through a Plate Glass Partition.—Have two plates with an air-space betwixt. An ordinary window may be glazed with double "sheets" or "squares" of glass; and if an air-space of a quarter of an inch is left betwixt each sheet or square of glass, sound will be deadened, and heat be retained. Mr. Bridges Adams has proposed double-windows, as described; that is, ordinary window-sashes, with double glass, having one eighth of an inch or one quarter of an inch air-space betwixt each square of glass. Ordinary windows in offices or street-fronts will be warmer, and deaden the sound, if they be so glazed.

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Correspondence

Unwholesome and Innutritious Bread.

Messrs. Editors :—Permit one of your readers respectfully to suggest that you could hardly do this community a more important service than by using your great influence as a scientific journalist, in endeavoring to prevail upon our city authorities, or whoever possesses the requisite power, to compel bakers and others dealing in bread to sell the same by *weight* instead of by *size*, as at present. It is not merely that the parties must at this time be making fortunes out of the necessities of the poor, but it is my conviction, founded on considerable experience and observation, that the system pursued in this city of selling bread by size is attended with the inevitable result of having the community flooded with an article which is not only unpalateable and innutritious, but which must, I conceive, be extremely unwholesome, and is, no doubt, the plentiful cause of much of the unhealthiness and mortality which prevails among children.

During a residence of over ten years in the city, I have had occasion to use the bread of perhaps thirty or fifty bakers, and as a general thing I have found that the only perceptible difference between that of one and another, lay in the various degrees of sourness and badness generally possessed by the whole. Saltness, bitterness, and other incomprehensible and nauseous flavors would occasionally supersede or accompany other defects, but sourness in greater or less degree was a perpetual concomitant. The other disagreeable flavors in the bread I am speaking of, I supposed to be indicative of the presence of carbonate of soda, or some other "corrective" of acidity; and if this supposition is correct, of course the quality of the article would be still more depreciated.

Now the main cause of all this I take to be nothing else than the absurd custom of bakers giving their customers *bulk* instead of *weight* of bread. Many a poor woman is foolish enough to believe that the large-sized loaf which she procures from Mr. Swill's bakery, though perhaps as sour as vinegar, is a much better bargain than those slightly smaller ones sold at Mr. Sugar's round the corner; the latter, it may be, being two or three ounces heavier than the former. But human nature is gullible, and thus it is that the favorite devices seen on baker's sign-boards in New York read thus—"*Large* Bread Bakery," "The Largest Bread in the City," &c. The *large* bread in question I have found by experience means simply *sour* bread; for it is a well-known fact that up to a certain point in the chemical process in the fermentation of bread, the *sourer* the dough is allowed to become the *larger* will be the bread baked from it. The writer has ransacked a large section of the city in quest of sweet bread (that is, good bread), and like truth itself, sometimes, he found it was nowhere to be found. I have tried different bakers, and the result has been that I have found one or two places where sometimes I could procure really good sweet bread; whilst in none of the others is it ever by any chance to be had. This circumstance would seem to show that the very great majority of bakers ferment their bread to the point of acidity designedly, for the purpose, of course, of giving as little weight and as much bulk as possible for the money. It is clear, therefore, that if by law or custom it became the rule to sell by weight only, the above evil would cease at once.

How is it with regard to bread elsewhere? I have read a good deal of the extent to which food is adulterated in London; but I have been twice in that city, and I have found the bread, at least, most excellent. If I went into (say) a third-rate coffee shop in London and asked for a cup of coffee and bread, I would have a slice of the latter placed before me, perfectly smooth and not at all crumbly, well baked, with a positively sweet smell, and "sweet as a nut" in the mouth. It might not have been the whitest bread in the world (recollect I am talking of a third-rate coffee shop), but it was evidently the production of a but who knew his business and performed it well. but any one try a similar experiment in a house of re reshment of the same status in New York, and in nine cases out of ten he will find the bread to be utterly detestable, half-baked, dirty, and sour; if of that nondescript kind called "ærated," it will not be sour indeed, but it will be saltish, if it has any flavor whatever. Self-raised bread, ærated bread, and all those quack improvements on the good old-fashioned yeast made article, are but poor apologies for bread in the view of any one who has been in the habit of using a first-rate article of the kind. If you visit a decent bakery in London or Edinburgh at the moment when the "batch" is being brought in from the bake-house, you will be greeted with an odor almost like that of a flower garden in June. Such bread will keep so for a fortnight; it will never sour at all; it will mould first. Such bread is manufactured by a "tradesman" who has been "brought up" to the business and expects to stick to it all his working life, consequently it is equally his interest and his pride to make it first-rate. Such is one reason of its superiority to bakers' bread in New York. But there is another and a stronger reason: such bread is intended to be sold by weight, and therefore the baker is not tempted to have it puffed up by fermentation to the point of sourness and never-so-many degrees beyond it.

Sir, won't you try your hand upon the City Fathers and the city bakers, and then perhaps some of these days, rich and poor alike in this great city will be able to put upon their tables that best, sweetest, most wholesome of all dietary articles—good bread. The bakers of ancient Rome were held in high estimation and were granted peculiar privileges; I have sometimes wished of some of the bakers of New York—not that they should be hanged, but soundly thrashed, for turning out such abominable stuff.

Yours respectfully, D. Pearson.

New York, Oct. 30, 1863.

[The subject our correspondent calls attention to is certainly an important one, and needs reform badly; his statements are in the main all correct. As regards ærated bread, tastes differ; some persons prefer it to that raised in the ordinary way, while there are still other individuals whose taste has become so vitiated by long use of the dry, husky, innutritious and unpalateable stuff sold for bread by city bakers, that they cannot endure any other kind. The only way to reform the matter is (as far as we can see) for families to make their own bread, or for some enterprising baker to start with a determination to make and sell only a good article; in time he might succeed; but the opposition of the unscrupulous, and the want of support from the community at large would for a time leave him very small profits.—Eds.

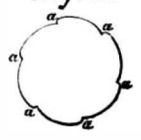
The Grooves of Rifles.

Messrs. Editors :—I have read several articles in the Scientific American respecting rifles, but have not yet noticed any allusion to the form of the grooves. About these I desire to make a few suggestions.

When a ball is started by the force of the powder in a rifle it is inclined to go straight, without a spiral motion; but as it is forced into the grooves it has to follow them. It will, however, always bear against one side of the grooves (which I call the edge), and will be loose at the other side of the grooves (which I call the back), where it will cause windage or leakage. Unnecessarily hard friction is caused by the bullet bearing against the bottom grooves, like those of Fig. 1, which is the common shape in most rifles. The edges of the grooves do not afford the ball sufficient support to give it the spiral motion, unless the grooves are quite deep.

Fig. 1.

Fig. 2.



The shape of grooves in rifles ought to be like those of Fig 2, in which *a a* are the edges, and against which the ball bears while passing through the barrel. The shape of the bottom and back of the grooves is such as will relieve the ball from friction, and yet keep it sufficiently tight to prevent windage. I have seen many rifles which would not shoot correctly except for a few shots; their grooves being like those of Fig 1. If the grooves are shallow the ball will not follow them; if deep it will clog them up, and besides there will always be windage. I have made new rifles and altered old ones, and have found by experiment that the best way is to make them with grooves like Fig. 2.

G. Hagenmeyer.

Big River, Mendocino, Cal., Oct. 1, 1863.

On Leakage of Petroleum Barrels.

Messrs. Editors :—As the leakage of petroleum and its derivatives is from ten to fifteen per cent, it becomes a matter of some consequence to inquire the cause, and apply, if possible, a remedy. A cask is built of a large number of narrow pieces of wood. The joints are rough, and not expected to be tight, unless subjected to pressure; a pressure that will in some measure embed the grain of the wood of one piece into the grain of that next in contact with it. Any relaxation of the joint and it will leak, even with the wood sufficiently close to prevent the insertion of any solid—a flag, for instance, that occupies an indescribably small space. It will also leak from a cause that seems to have received very little attention from coopers or others—a force much greater than the weight of the fluid exerting itself in an effort to gain a lower level.

The experiment has often been tried of bursting a strong cask by the weight of a few ounces of water more than it will contain; and the hydrostatic force which thus exerts itself is as well understood as it is wonderful in its effects. Now there is something similar going on in every cask. It is well known that casks are not filled entirely full; there is some ullage left. This is most necessary, as all oils, and (indeed every liquid stored in casks) will expand when heated, and room must be allowed for this expansion or the cask will burst. But although the ullage space may be more than sufficient to allow for the expansion of the fluid, the agitation in railroad or teaming transit, or on ship board, in addition to an increase of temperature, will cause it to give off its component gases: these gases make an effort to occupy more space than when in a fluid state, and as they have no more space to occupy, the consequence is a pressure on the surface of the fluid, which diffusing itself throughout the mass, exerts a corresponding pressure on every square inch of surface that confines it. Here then we have a pneumatic and hydrostatic pressure, impelling leakage. In this way alone can I account for the rapidity with which a barrel will empty itself through an extremely small space, and for the explosion of barrels of petroleum, while admitting that petroleum itself is not explosive. In experiments that have been instituted to test the explosiveness of petroleum, the barrels were set on fire and consequently did not explode. But if they had been subjected to a certain degree of heat until they had burst, perhaps spontaneous combustion would be simultaneous with an explosion.

I remember to have read of two cases in point that occurred in New York; one about two years ago. A cask was emptied of liquor, bunged tight, and placed on the sidewalk in front of a store. The day was very hot: the sun shone on the cask; it exploded, took fire, and several persons were injured by the splintered fragments. The other case occurred in August, last year. An empty barrel that had contained benzine was standing on the sidewalk in Center street; a passer-by wishing to light his cigar struck a match on the head of the barrel, when it instantly exploded, and the man was injured. Other instances could be cited: but these will suffice.

Thus, we have a force or forces of no ordinary character continually impelling leakage of barrels and subjecting the package to an internal pressure, which, from its principle of construction, it is not adapted to resist. On the contrary it has a natural disposition to expand, and is held together by the strength of the hoops alone. Leakage follows the slightest relaxation of the joints of barrels, from which it is obvious that the less joints we have the better. In considering the construction of the cask, we find a strong disposition to expand. The staves are continually making an effort to straighten themselves. This is a force always at work, to the injury of the package, and any weight on the bilge increases this tendency of the ends to expand. The slightest relaxation of the chime hoop is followed by the

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staves; there is a consequent opening of every joint, of stavesand head, and leakage follows. Now, if in addition to lessening the joints, we can turn this expansive force, whether arising from internal pressure of contents, or from the efforts of the staves themselves to expand, into a power exerting itself not to the injury but for the benefit of the package, we will have accomplished much.

A cask is tight in consequence of the pressure of the hoops, or rather by close contact of wood to wood, under pressure of the hoops. Now, what we require of a chime hoop is that it must bind the joints of the staves, the joints of the head and the contact of the head with the staves, at its periphery. This in five cases out of ten it will not do; in the other five it cannot. In cases where it will not, the cooper designedly cuts the head too large, leaving an arbitrary allowance for shrinkage. The joints of the staves will not close until the head has shrunk, meantime theopen joints are filled with flag--a cellulose plant that swells with some liquids, and can be compressed into almost nothing. Such joints will not be tight for subtle fluids, that will not swell the flagging, but which pass through it; for these fluids the only tight joint is the close contact of wood to wood. The hoops cannot bind the head, when it shrinks more than was allowed for; the hoop binds tightly the joints of the staves; the staves resist more compression, and yet do not bind the head, it being too small. But suppose the wood is all well seasoned, and the fit just what it ought to be. The wooden head of the forty-gallon barrel is subject to other serious defects, that the binding hoop cannot overcome. I have chosen the forty-gallon barrel as an example, because it is the package most commonly used, and its head is generally of two pieces, having one joint. In putting the heading together it is always the wood nearest the alburnum, that is, at the joint. Being more soft and sappy than the older wood, it consequently shrinks more, and mostly in the center; the joint ceases to be a true one; it is closed and tight at both ends, and no pressure of the hoop can make it more so; yet it remains unclosed in the center. The unsightly resort of chinsing is the only means left to tighten such a joint.

I have now shown that there are cases where the chime hoop cannot make the package tight; is there anything in the head that we can improve? It injures the package by requiring the reduction of the staves for a groove to place it in; their strength is also impaired at this groove or croze, being squeezed between the edge of the head and the hoop, and broken chimes are the consequence. Again, the head, from the pressure of the hoop or other causes, is apt to deviate from its place, such as from the pressure of the hoop, when the head is thin, from atmospheric pressure; from the joint not being at right angles with the plane of the head; from the habit of transporting on end in rail cars, and from other causes not necessary to mention. The fact that the majority of barrel heads are concave is sufficient for my purpose; for whatever tends to produce this effect injures the packages, as concavity tends to weaken the resistance of the head if subjected to pressure of the hoop, and if not, draws it out of the croze. The staves do not follow, but try to get away from it, and thus it is left to maintain itself as best it can. This frequent concavity of the heads may seem to conflict with my theory of internal pressure, but it does not. I have seen a considerable degree of convexity given to cask heads by the pressure of fermentation, and if vent had not been given, the heads would have been blown out. A steam boiler or a barrel is made to resist a certain degree of pressure; but if either is subjected to more than it was intended to resist, it will burst. I consider the internal pressure, to which I have referred, only capable of accelerating leakage, and assisting the tendency of the staves to expand. When the pressure is increased it gives convexity to the heads, but the instant the package gets vent, collapse occurs; yet the escape of the gases is not instantaneous: the atmospheric pressure on the heads forces them in; thus, concavity is the most usual form of their deviation from the plane.

Now, I overcome the manifest defects of the wooden head, by substituting an iron one for it. Thus I lessen the joints, and absolutely remove the possibility of shrinkage and leakage from those parts of the package at present liable to these most serious objections. By having the periphery of the head turning over as a flanch corresponding to the chime hoop, I compel the expanding staves to exert their force in tightening the head, and any disposition to convexity or concavity only tends to increase the so-much-desired result—the production of a tight cask. The purchaser always contracts for a tight barrel, and the cooper always tries to produce one. But I have shown that there are causes at work which often prevent this. In the case of petroleum, it is a matter of the most serious importance to have tight packages. There is one European city at present in danger of conflagration from leakage of this fluid. Their danger is not greater than ours, only it presents itself more visibly before them. After heavy loss in this way the insurance interest will make itself felt, and require the production of a tight package. By preventing leakage we prevent the liability to explosion, and thus reduce the risk and precaution necessary in handling and storing this volatile liquor.

JOHN CONNOLLY.

Boston, Oct. 27, 1863.

Nitrous Oxide, an Anaesthetic.

MESSRS. EDITORS:—In the last number of the SCIENTIFIC AMERICAN I notice a communication from a gentleman who signs himself "Professor H. Dussauce," on the "Abuse of Exhilarating Gas in Surgery," in which, while it is admitted that the gas will produce "insensibility to pain when used as an anaesthetic agent," it is said that "it appears unsafe to employ it in surgery, even for such small operations as teeth." Professor Dussauce says this is claimed as a new anaesthetic agent, when a work was written on this subject in 1847.

Now the first idea of producing anaesthesia (years before ether or chloroform were used) originated in the mind of Dr. Horace Wells, dentist, of Hartford, Conn., at one of my exhibitions of the effects of the nitrous oxide, or "laughing gas," in that city, on the 10th of December, 1844. And on the day following, I administered the gas to Dr. Wells for the extraction of a large molar tooth. I instructed Dr. Wells to make the gas, and he continued to use it in Hartford with entire success during the winter, spring, summer, and fall of 1845. A work on "ANAESTHESIA" by the Hon. Truman Smith, contains the depositions of some sixty of the most respectable people of Hartford, including Bishop Brownell and daughters, establishing these facts. It was not until November 1846 that ether came into use—this being the date of Morton's application for a patent. Here were several years in which the whole subject of anaesthesia was in a chaotic state—having produced very little impression on the minds of scientific men. Wells died, and with him died the use of the nitrous oxide as an anaesthetic—in fact before it had been thoroughly tested. Ether gradually came into use, and as this could be readily purchased at any drug store, no one used the nitrous oxide; for it required some chemical knowledge and expensive apparatus to make it.

In May last, I determined to revive and thoroughly test the value of the nitrous oxide as an anaesthetic. I found it to answer a most admirable purpose for brief surgical operations, such as the drawing of teeth. During a space of three weeks and two days, at New Haven, I administered the gas, and Dr. J. H. Smith extracted *three thousand teeth!* The gas was administered, among others, to persons suffering from almost every variety of disease, and yet with no unpleasant effects.

As to any injury resulting from the inhalation of this gas, I may state that I have made and administered probably fifty times as much of this gas as any living man. During the past twenty years, I must have administered it to twenty thousand persons, having breathed it many thousand times myself, and with no ill effects. From the use of chloroform and ether, over three thousand deaths have already occurred. Not a single death has occurred from the use of nitrous oxide gas. The common effect of ether and chloroform is to produce nausea, sickness, and often convulsions, and they sometimes linger in the system for weeks. None of these unpleasant effects follow the use of nitrous oxide. The whole time occupied in the inhalation of the gas for teeth extraction and returning to perfect consciousness, does not exceed three minutes. There is no reaction or depression following its inhalation. A large number of surgeons and dentists have called at our office to witness its operation in the extraction of teeth; and all, without a single exception, have expressed a preference for it over ether and chloroform, for such a brief operation. To avoid all injurious effects, the gas, of course, must be made very pure, and administered with discretion.

The New York *Dental Journal* for September 1863, says:—"Since our article on anaesthetics was in type, we have had a large number of patients to whom we have administered nitrous oxide, and we must say that its results have been entirely satisfactory; not only to ourselves, but to all those who have taken it. When a short operation is to be performed, we consider this anaesthetic one of the best ever introduced to the profession. It seems to leave the patient, in from three to five minutes, in a better condition than before taking it. . . . We must confess that chloroform or ether we were unwilling to take ourselves, and never did to insensibility, and never gave it with entire freedom from apprehension. But nitrous oxide we have often taken for our own satisfaction, without the slightest deleterious effects, and the pleasurable sensations we feel are beyond description. In fact, it renders the much-dreaded extraction of teeth a pastime of pleasure and happiness."

I hope to hear no more of the danger of taking the nitrous oxide. G. Q. COLTON.

No. 22 Bond street, New York, Nov. 7, 1863.

Formal Inauguration of the Great Boston Organ.

We gave an account of this immense instrument on page 291 Vol. IX. (current series) of the SCIENTIFIC AMERICAN. Since that time it has been formally presented to the public, with appropriate ceremonies. The following account is cut from the Boston *Advertiser*:—

"The formal transfer of the Great Organ from the Committee under whose direction it was built, to the stockholders of the Music Hall Association and subscribers, was made on Saturday evening with simple but impressive ceremonies. The number of gentlemen present was not far from a thousand, comprising the stockholders and subscribers, members of the city government, and a few invited guests. A few gentlemen, comprising the committee, the builder's son, Mr. Walcker, and the master workmen engaged in the enterprise, occupied seats on the platform. At about the appointed time, eight o'clock, strains of sweet music were for the first time heard from the great instrument, which was completely hidden from the gaze by a screen of green, extending from floor to ceiling. So thoroughly rapt were the audience in the rich swelling notes of the organ, that they hardly observed the dimness of the light, which seemed to throw a veil of solemnity over the whole scene. For nearly twenty minutes the audience sat thus; then the music ceased, the gas-lights flashed forth in all their brilliancy, and the huge curtain began slowly to descend. Not a whisper broke the charmed spell. All eyes were riveted on the opening space. First appeared the little cherubs that surmount the domes of the main towers of the structure, then the domes themselves, and the triple columns of great pipes, and quickly upon this the full breadth of the wondrous instrument, resplendent with its burnished columns and golden reliefs, and grand and majestic in the symmetry of its massive and beautiful architecture, burst upon the view. The silence was broken by one universal cheer. The audience rose to their feet, and cheers upon cheers marked the auspicious moment. Never, on any public occasion, have we seen such genuine enthusiasm. The scene was grandly impressive, and will not be forgotten in a life-time."

RURAL SIMPLICITY.—During the flight of Professor King's balloon on the 14th, from Bangor East, it passed over the clearing of a settler who does not take the newspapers. The flock of children round the floor, spied the monster booming on, and alarmed the mother, who, rushing to the door, screamed out, "Come in, children, it's one of Jeff. Davis's bomb shells." This is a fact.—*Calais Herald.*

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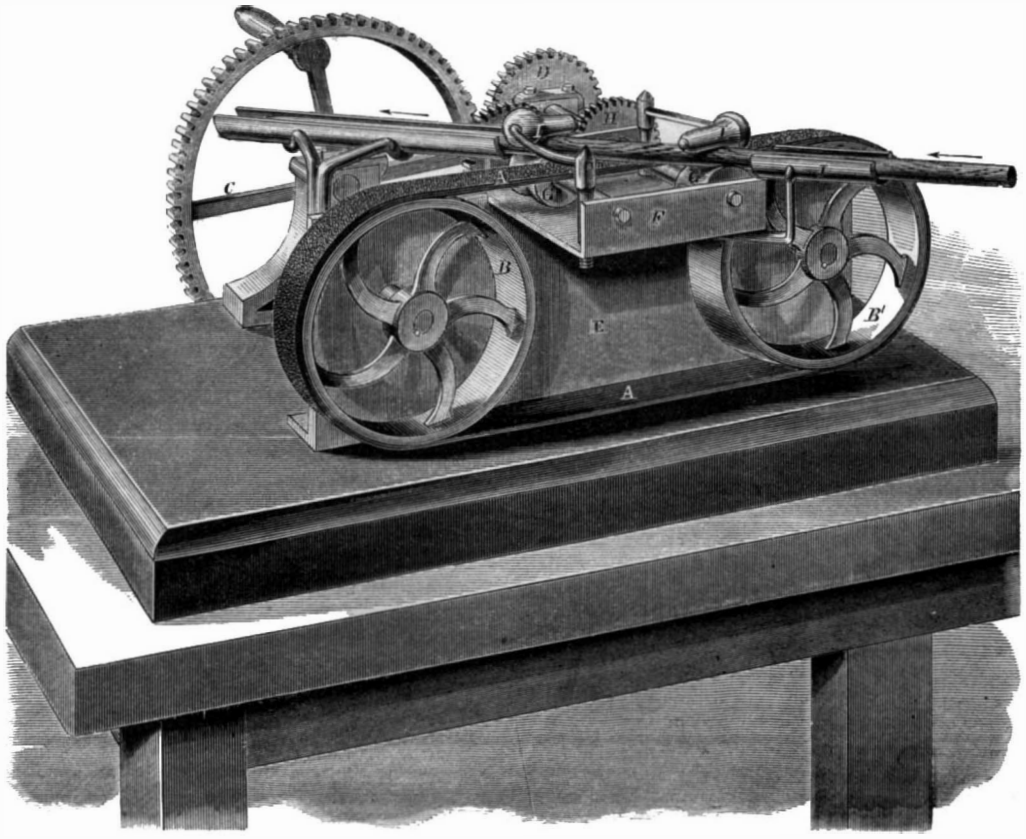
Improved Polishing Machine.

There are numbers of small articles in use every day which have a high degree of finish imparted to them, and yet are afforded at a very low price. This could only be done by the use of improved machines that work speedily and accurately. Lead-pencils, pen-holders, wooden crochet needles, and even small metal rods, can be polished handsomely and with great celerity, by the aid of the machine herewith illustrated. The apparatus itself is very simple in its character and construction; the principal parts being an endless belt, A, covered with emery running over the pulleys, B and B'. These pulleys are driven by the larger spur wheel, C, through the intervention of the pinion, D, and a shaft running through it and the pulley, B'; both of these pulleys run through the bracket, E. The table, F, carries two feed rolls, G, made of india-rubber; these rolls are made from a belt on the shaft running through pulley, B', and are connected with each other by the small gears, H; the rolls are placed alternately on either side of the polishing belt. There are two smaller spring rolls, I, which confine the work to the belt; these rolls run freely on their bearings and have enlarged ends, so that the work cannot run off or twist while being polished. The work to be polished, supposed in this case to be a pencil, is placed in the trough, J, and the handle on the wheel, C, turned. This operation gives motion to the emery belt, A, and drives the rolls so that the pencil is moved onward diagonally in the direction of the arrows. This imparts a smooth and beautiful finish to the work and much improves its appearance. The machine is shown temporarily affixed to a table or bench, and it can be driven by steam or any other power.



WADLEIGH'S POLISHING MACHINE.

Patented on July 21, 1863, by Warren Wadleigh, of Sanbornton Bridge, N. H.; for further information address D. H. Priest, New England Handle Company, 46 Congress street, Boston, Mass. State, county or town rights for sale.

SUGAR IN ENGLAND.

Sugar sells at about double the price in New York that prevailed two years ago, and it is scarcely possible to account for this great rise by the law of demand and supply. There has not been a scarcity of the article, but an increase in the quantity. In London the quantity in store on the 20th October was 109,000 tuns, against 87,000 tuns at the same period last year. In 1862, the total import of sugar into England was 494,465 tuns, and in the first eight months of the present year 433,867 tuns—only 60,598 tuns less. It is expected that the total import this year will be 539,800 tuns.

France has imported 36,740 tuns less during the first eight months of this year than in the same period of 1862, which leaves a greater supply for other countries to the same extent; and yet prices have been advanced in England as well as in America. The stock of sugar in all Great Britain on October 1, amounted to 230,000 tuns, against 181,000 tuns last year, and 162,000 tuns in 1861.

Yellow Havana was selling at 40 shillings per 112 pounds; Mauritius at 30 shillings; Jamaica, 35 shillings. The duties upon these qualities of sugar range from 12 shillings and 8 pence to 18 shillings and 4 pence per 112 pounds. The price of refined white sugar in London, October 10, was 45 shillings per 112 pounds, for fine yellow, 38 shillings; or about 9 cents per pound for the white and 8 cents for the yellow.

SPECIAL NOTICE.—Leonard Smith, of Troy, N. Y., having petitioned for the extension for seven years of a patent for smut machines, granted him on Feb. 12, 1850, and which expires on Feb. 21, 1864, it is ordered that the said petition be heard on Jan. 25, 1864 at the Patent Office at Washington. All persons opposed to such extension are required to appear and show cause why it should not be granted. The testimony in the case will be closed on Jan. 11; depositions and other papers relied on as testimony must be filed on or before that day.

COLBURN'S LAMP FILLER.

The rapidity with which kerosene oil has come into general use for illuminating purposes has been so great that the inventive genius of the age has been taxed to its utmost capacity to simplify the class of lamps adapted to its use. It is believed that more patents have been granted for improvements in lamps within the last three years than ever before in the history of this article. Among the latest is one to facilitate the filling of lamps without inconvenience or delay. All who have used kerosene oil know that it is not a pleasant task to fill a lamp in the ordinary way. To remove the chimney, unscrew and take off the burner and hold it so as to pour in the oil without soiling the hands or garments, requires a great deal of care. In spite of all possible caution it often happens that the lamps are filled too full, and then everything in the vicinity is soiled by the overflow. Clumsy people often make a great deal of trouble for themselves by not inserting the burner in the lamp properly, so that the screw will take.

The lamp filler herewith illustrated is designed to obviate the difficulties mentioned, and does so perfectly. It is a small, neat attachment, placed between the burner and the collar of the lamp; through it the oil chamber can be filled with perfect ease. The filler (see small figure) is made in sizes to fit any lamp, by simply screwing it into the collar thereof, and then screwing it into the burner. It is simple and can be furnished for those wishing to apply it to lamps now in use at a trifling cost. The position of the chimney and attachment during the operation of filling is shown in the large figure.

This invention, by G. F. J. Colburn, of Newark, N. J., was patented through the Scientific American Patent Agency, on July 14, 1863, and issued to Lemuel Beers, Newtown, Conn., sole assignee. Further information can be had by addressing the manufacturers, Messrs. Beers, Judson & Beers, at No. 43 John street, New York City.

Strike of the Machinists in this City.

The machinists of this city are now on strike for an advance of 25 per cent to their wages. It is asserted that the amount of pay they receive has been over-estimated, and that instead of $3 they receive but $2 per day. Several of the principal firms have complied with the demands of the men, but the larger ones—the Novelty, Morgan, Allaire, and other shops—refuse to pay the advance, alleging that their contracts were taken at prices which do not admit of raising the average rate of pay. The men are quite firm in their demands, but have not as yet any recognized organization.

THE STARVATION OF UNION PRISONERS BY THE REBELS.—It is becoming a serious question as to what shall be done to relieve the sufferings to which the necessities and the brutalities of the Rebels have doomed the 13,000 Union prisoners in Richmond, 1,000 of whom are officers. If they cannot be released, and the rebels still refuse to exchange, it is a question whether they ought not to be forced to feed them themselves, or as the least that can be demanded under the laws of war, to allow our Government to feed them.

CONSUMPTION OF COAL BY GOVERNMENT VESSELS.—The quantity of coal required for Government vessels is really incredible. There are three hundred and fifty steamers afloat in the service burning coal. The *Ironsides* alone burns two tuns per hour, forty-eight tuns per day, or sixteen thousand tuns per annum. One million five hundred thousand tuns is the estimated quantity required for this part of the service.—*Washington Union.*

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VOL. IX, NO. 21...[NEW SERIES.].....*Nineteenth Year*

NEW YORK, SATURDAY, NOVEMBER 21, 1863.

OPENING OF A NEW CAMPAIGN.

It appears quite evident to all who observe the signs of the times that Generals Grant and Meade are about to open a new campaign, which we trust will inaugurate glorious results. Not exactly following in the wake of these military chieftains, the Publishers of the SCIENTIFIC AMERICAN propose to begin, on the first of January next, a new and brilliant campaign in the fields of popular science, and they hope to give renewed assurance that this journal is fully up to the stirring events of the day. After a flattering success of eighteen years, the SCIENTIFIC AMERICAN will commence a new volume at the time mentioned, being the "Tenth" of the "New Series." The Publishers earnestly appeal to their friends and patrons, far and wide, to reinforce their subscription list by the formation of clubs.

They feel warranted in saying that no better expenditure of money can possibly be made than for a years' subscription to this journal, which is the only one of its class now published in the United States. The Publishers promise untiring devotion to the interests of their patrons. No department of the journal will be allowed to fall behind preceding years; while it will still be their aim to excel in every respect.

Friends and Patrons, we ask with confidence a continuation of your former patronage, and also your influence in promoting a wider circulation of this journal than it has hitherto enjoyed.

Our New Prospectus will appear next week.

PREVENTION OF DANGER FROM PETROLEUM.

Within the compass of history no trade has sprung into such magnitude in such a limited period as the petroleum business. From an export of five million gallons last year, it has advanced to more than twenty millions this year, and the home and foreign consumption combined will exceed forty million gallons. The rise of this immense trade seems almost like the creation of a mighty magician, rather than the consecutive efforts of men. Much useful information has already been presented in our columns respecting petroleum; but new facts relating to it are being continually developed which demand attention as they arise. For example, in the unrefined article there are several distinct products, which vaporize at different degrees of temperature. Now in carrying petroleum from one place to another, or when it is lying in stores or sheds, some of the liquid is liable to be exposed to such a temperature as will convert it into vapor, in which state it will escape through very minute openings or pores in the vessel containing it. A loss of the liquid is not only thus caused, but this vapor when it escapes and mingles with about eight times its volume of air, becomes as explosive as gunpowder, and if the light of a match or lamp is then brought into contact with it, a violent explosion will take place. Several sloops loaded with petroleum have been subjected to explosions by the escape of petroleum vapor from the barrels in their holds, and an accident of a similar kind recently took place in the rear store of a large druggist's establishment in Albany, N. Y. Cases like these call for preventive agencies; such as vessels that will not leak, and special places for storage. As a measure of safety, neither ignited match, lamp, nor light of any kind should ever be used in the vicinity of a large vessel containing petroleum, and it should be stored in a building or apartment exclusively devoted to hold it; not in cellars or storehouses, as a promiscuous article. As to vessels for carrying it, the cars on railways, the sloops on rivers and steamers on the sea, should be built of iron and rendered as tight as possible. An English iron steamer, constructed expressly for carrying petroleum from the United States to Liverpool, has been very successful, and others may be built upon the same principle. Another important agent of safety is the use of small tight vessels containing it, such as barrels. Perhaps these are of most consequence, for if it be possible to make perfectly tight barrels, the use of these will secure immunity from leakage and the dangers we have set forth. A letter upon another page of the present number of the SCIENTIFIC AMERICAN enters very fully into the defects of common barrels for carrying such an article, and an improved method of constructing them to prevent leakage is pointed out. But it may be asked, why not use iron cylinders instead of wooden barrels for such a purpose? Large quantities of caustic soda are exported to our ports from Europe to be used in refining petroleum, and air-tight cylinders of wrought iron are employed to contain it. Such vessels would perhaps answer a better purpose than casks, but so far as we know they have not been tried. Then, again, there is the system for preventing leakage of petroleum barrels used by Young in Scotland for his coal oil, as described in the SCIENTIFIC AMERICAN of last week. This consists in coating the interior of each barrel with glue, a substance which is not affected and dissolved by the oil, like a varnish of resin. We have not heard that any of our merchants and dealers in petroleum have tried this simple method of preventing leakage in petroleum. It certainly deserves a fair trial.

We have thus briefly alluded to preventive measures and agencies for securing immunity from explosions, conflagrations and loss by the leakage of petroleum in transit and in store; and if the suggestions made and the information given are acted upon and applied good results will be secured. At present the petroleum business is not in a prosperous condition, and there are some signs of the supply failing. In Canada, the oil wells have nearly all given out, and many in Venango county, Pennsylvania, are in the same predicament; but if the petroleum wells should fail there will be a return to coal oil, and the foregoing remarks are also applicable to vessels for containing it.

STEAM ON CITY RAILROADS.

It is announced in one of our cotemporaries that six "dummy" engines are building for a street railway in Philadelphia, and but a short time ago we saw mention made of another enterprising corporation that had determined to adopt steam in lieu of horse power, and thereby save themselves and the public both time and money. It is almost useless to expect anything of our railroad authorities in this respect; notwithstanding all the examples set before them, the arguments in favor of the steam system, and the evidence of common sense, we still have to put up with horse power; and the only dummies in use or in existence on our street railroads seem to be those persons who direct and control the principal interests of them.

The gridiron railway, in spite of the outcry and opposition manifested toward it, is gradually extending its iron arms, and even now grasps by far the greater part of the city streets occupied by vehicles devoted to passenger traffic. We had hoped that the directors of these roads would have seen fit to try at least one of the steam cars (they are *not* "dummies"), and compare the cost of running it with that of horses in all essential points; thus to satisfy themselves by practical demonstration that steam is better than horse power for the purpose discussed. In this we have been disappointed, and horses rule the road, to the exclusion of machinery, which is obviously cheaper than any other means of transportation.

It would be considered fatuitous and short-sighted to the last degree for any railroad company to discard all its engines, run a canal alongside the line, and put on a number of boats and horses to "accommodate freight;" yet this the street railways do, in effect, by employing horses to accomplish tasks that properly belong to machinery. Even in the absence of any positive data in black and white as regards the expense of the two systems for carrying passengers by steam or horse power, it is safe to assume that the former is the most preferable in all respects, on the general ground that the introduction of machinery inevitably enhances the profits of any trade or business, provided the same be properly carried on.

There is no occasion, however, to presuppose that railroad men are ignorant of the comparative economy of steam as opposed to horse power, and we must seek for some other motive for their non-adoption of the first. Certainly no unprejudiced person could hesitate to declare in favor of steam; the arguments published from time to time in the SCIENTIFIC AMERICAN, (which have never been refuted in the slightest particular) show conclusively that the advantage is in favor of steam. We can only await the slow dawning of intelligence and enterprise upon the minds and convictions of our railroad men; for the pressure of public opinion and the examples of the directors of street railways in other cities seem thus far to have had very little effect.

LAKE SUPERIOR COPPER WORKINGS.

A large and most interesting pamphlet by Charles Whittlesey, Esq., on Ancient Mining on the shores of Lake Superior, has been published as one of the Smithsonian contributions to knowledge. The author has devoted much attention to this subject, and maps of the country, with engravings of old mines and the relics found in them, are contained in this publication. We here learn that evidences of ancient mining operations were first brought to public notice in the winter of 1847–8. The Jesuit Fathers who first visited that region announced the presence of native copper in large masses; and boulders of copper had been found many years ago scattered among the drift gravel, from Lake Superior to Rocky river, in Ohio; but no ancient workings were known till the period mentioned above. In casting the eye over a map of Lake Superior, a remarkable projection, in the form of an immense horn, is observed jutting out from the south shore and curving eastward. This is Keweenaw Point, which is about eighty miles in length and forty in width. Through the whole of this extent of projection, a belt of metalliferous formation extends; and within this all the copper mining operations—ancient and modern—have been confined. The most remarkable feature of this metalliferous region is the character of its products, which occur, not as an ore of copper, but in masses, veins, and rounded nodules of the metal itself.

The first actual mining operations here were commenced in 1761 by Alexander Henry, but they proved abortive. In 1841, Dr. Douglas Houghton made a report to the Legislature of Michigan, conveying very definite information respecting the existence of native copper in Lake Superior, and shortly after this fresh mining operations were commenced, and speculators flocked in from all quarters. In 1848, Mr. S. O. Knapp, Agent of the Minnesota mine, made the first public announcement respecting the discovery of ancient mines and the relics of an ancient mining population. This created a sensation far and near, and subsequent explorations have led to the discovery of very many ancient pits. Most of the ancient diggings have been found in dense forests, and outwardly consist of irregular shallow hollows, which had been previously noticed without thought of their real character. There are three groups of ancient mines corresponding with the modern mines in this region. In these old pits, hard stone mauls and hammers have been discovered; also copper hammers, spear heads, gads, arrow heads, and knives; and wooden shovels, levers, and a ladder. During the past summer, several of these old mines were discovered in the Ontanagon district, and from one a bag of untanned leather in a perfect state of preservation was taken, and has been considered one of the

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greatest of ancient curiosities. Who those olden miners were, is a puzzle to antiquarians. But providentially they have done great service to us, for our practical modern copper miners regard the old pits as pretty sure guides to valuable copper lodes. When an old pit is found it is cleared out and explored, and generally the miners are rewarded by finding rich masses in the excavation. Those ancient miners seem to have possessed quite as accurate a knowledge of the copper veins as the most skillful and intelligent modern mineralogists and miners. In a certain sense they were our mining pioneers. They do not seem to have been acquainted with the art of smelting copper, and were unacquainted with the use of iron; therefore their efforts at mining were rude; still they have left evidences of being an ingenious and skillful people. Mr. Whittlesey entertains the opinion that these ancient miners were not of the present Indian race. As yet no remains of cities, no graves, no domiciles or ancient highways have been found in the copper region. These old miners appear to have been further advanced in civilization than those whom we call Aborigines. Trees standing upon the old pits are about three hundred years old, and beneath these lie the rotten trunks of a still earlier period. When the ancient miners lived is unknown, but these mines must have been abandoned at least from five to six hundred years preceding the present age. Who they were, where they came from, and whither they went, in all likelihood will never be known.

The copper mining business in the Lake Superior region is in a very prosperous condition at present; and we learn from the *Mining Gazette* (Houghton, L. S.,) that a new copper smelting establishment is now in operation on Portage Lake; which with the one recently erected in California, will make eight now in operation in the United States.

LEAD AND WATER.

By taking a strip of clean lead, and placing it in a tumbler of pure water (say rain or soft water), in less than an hour, by dropping in the tumbler a little sulphide of ammonium, a black precipitate will be thrown down, consisting of the sulphide of lead—*e. g.*, lead must have been dissolved and held in solution in the water, and as the salt of lead happens to be classed amongst some of the most dangerous poisons, we are necessarily led to the conclusion that lead pipes conveying water, if the latter is pure, must be somewhat dangerous. Water standing in a lead pipe for some hours decomposes the metal, and when it is run off the poison is carried with it. Water drawn in the morning through a lead pipe should never be used for domestic purposes, such as cooking or drinking, and servants in cities should be instructed respecting this particular subject, because they are usually ignorant of the nature of lead, and the effects of water upon it. Several metals taken in food or drink accumulate slowly in the human system and ultimately produce disease; but it approaches so stealthily that the danger is not usually apprehended. Some of the salts of lead are not poisonous, and the sulphide is of this class. The interior of lead pipes may be converted into an insoluble sulphide of lead by subjecting them for some time to the action of a hot sulphate of soda in solution, according to the recent discovery of Dr. Schwarz, of Breslau. Those who prepare lead pipe for conveying water for domestic purposes, should test the alleged discovery, as it is of the utmost importance that all the safeguards to health should be enforced and multiplied.

GREAT TELESCOPE AND PHOTOGRAPHS OF THE MOON.

The American *Journal of Photography* contains a very full report of Henry Draper's paper recently read before the American Photographical Society on his new telescope, and the large photographs which he has taken of the moon. In the paper it is stated that in the autumn of 1858 Dr. Draper determined to make the largest reflecting telescope in America, the construction of which, with various improvements introduced, have occupied his time up to the present period—more than five years. This telescope is nearly 16 inches in aperture and 13 feet in focal length, and was intended to be devoted to celestial photography; consequently it has many novelties fitting it for this purpose. It has the largest silver reflector of any instrument in the world, with the exception of the one in the Imperial Observatory at Paris. A reflecting telescope is greatly superior to an achromatic one for photographic purposes. Dr. Draper first used speculum metal for his mirrors, but abandoned it at Sir John Herschel's suggestion in favor of silvered glass; the reflecting power of the latter being 93 per cent; that of the former being but 75. The glass mirror also only weighs 16 pounds, whereas one of the same size of speculum metal weighs 138 pounds; and if the silver of the glass should accidentally be injured, it may be dissolved off by nitric acid and the mirror re-silvered in the course of a few hours. This may be repeated an indefinite number of times. The mirror of this telescope has cost Dr. Draper an immense amount of toil, in order to reach as nearly as possible to perfection. He ground more than one hundred mirrors of different sizes, from nineteen to one quarter of an inch in diameter. The mirror of this telescope is sustained in a walnut tube hooped with brass, and the frame in which it is mounted holds it at both ends, to avoid the tremulous motion so common to large instruments. When photographs of the moon are being taken, the telescope is not driven by clock work, but is allowed to come to complete rest; the sensitive plate alone is moved in a direction and at a rate to correspond with the moon's motion. By this mode of operation, only one ounce instead of half a tun is moved. The observatory of Dr. Draper is situated at Hastings, N. Y., on a hill 250 feet above the level of the sea. The dome which covers it is 16 feet in diameter, supported on a point at its center, and can be turned with a gentle pressure of the hand. This instrument can be directed to an object, shifted, and the observer himself moved to any part of the building, by a very slight exertion. A photographic laboratory is attached to the observatory. It contains all the requisite conveniences for taking photographs up to sizes of three feet in diameter. One of three and one of two feet in diameter of the moon have been taken. The former represents the moon on a scale of 70 miles to the inch; the latter—two feet picture—is the largest that had previously been made anywhere. Celestial photography is as yet only in its infancy, but it is progressing rapidly.

THE END OF A BLOCKADE RUNNER.

The steam transport *Fulton*, on her last trip to this city from Port Royal, captured a blockade runner after a sharp chase and brought her to this port. We have received the following details from an officer concerned in the capture, and reproduce them that our readers may know what sort of craft are engaged in this traffic.

The steamer was called the *Margaret and Jessie* of Charleston, but her real name was the *Douglas*; she having been built by R. Napier & Son, Glasgow, for trade along the English coast. The ship is about 200 feet long, 23 feet beam and 9 feet depth of hold, approximately. She has feathering side wheels, is built of iron and set down at 800 tuns burthen; she has no masts or rigging, except a sort of spar, rigged forward for hoisting freight out of the hold; on this spar a sail was temporarily rigged. There are three water-tight bulkheads. The deck is flush above, having no houses or cabins to break the extent, and affording a clean sweep from end to end of any seas that may chance to come on board; the accommodations for the crew are all below, and rather limited at that. The machinery consists of two oscillating engines, 50 inch cylinder and 5 feet 6 inches stroke, approximately; these have slide valves and link motion, to work either backward or forward when hooked on. The boilers are peculiar, but a description of them without engravings would be uninteresting, and so we omit it. The engines have made 15 revolutions with 5 pounds of steam (the stroke is short it will be remembered), and have made 30 revolutions on some occasions; not with that pressure however. The average revolutions are 25 with steam pressure of 15 pounds per square inch above the atmosphere, average vacuum 25 inches. The speed of the ship is about 14 knots per hour. When the engineers from the *Fulton*, Mr. William Cumberson and Mr. Henry Smith, went on board they found the machinery uninjured; the bolts in the cylinder head were slacked off, probably with the amiable intention of scalding our engineers when steam should be applied; in other respects the engines were not meddled with. One fireman volunteered some impertinence, but was promptly subdued and rendered docile. The *Fulton* after the capture turned about and went on her course, and the prize also put on steam and humbly followed in her wake. During the chase the *Fulton* far outstripped the naval vessels, *Keystone State* and *Nansemond*, and had it not been for her fortunate appearance on the scene the rebel would have escaped; she had already made fourteen successful trips.

An Enterprising Firm.

While on a recent tour of observation among the principal machinists and workshops of note in Providence, R. I., we took occasion to step into the premises occupied by Messrs. J. R. Brown & Sharpe, for the purpose of inspecting their tools, &c. Nearly every machinist has at some time used a steel scale or rule, and knows what a convenience and even necessity it is. These scales are made here in large numbers, and are very accurately divided by a machine constructed expressly for the purpose. These scales are also straight-edges, being truly planed on both sides. The separations for fractions of an inch are made by a diamond (not a diamond-pointed tool), and the gradations are also carefully inspected from time to time, so that they may not exceed or fall short of the United States standard.

All sizes are made here, and in addition there is another tool called the "Vernier caliper," which combines simplicity of construction with a wide range of usefulness. It is not possible to describe it clearly without an illustration, but we may say that inside measurements, also distances with dividers, &c., may be obtained with correctness and facility. The 3-inch scale of Messrs. Brown & Sharpe is a very convenient tool and can be carried in the pocket without incommoding the owner. The principal article of manufacture of this firm is the Willcox & Gibbs' sewing machine, which is produced in large quantities, thousands having been sent off in the past few years. It is quite noiseless in its operation and attains good results. Our principal object in speaking of it is to mention the peculiar points in which improvements have been made in the process of manufacturing it. Among these we noticed a very neat thing in the shape of an expanding rimer. This tool, as all mechanics know, wears by constant use, so that the size diminishes; through the agency of a simple contrivance the rimmer is made to expand as it wears by use and sharpening, so that the standard size is always maintained. The several points on the frame of the sewing machine, on which the accuracy and position of other parts depend, are all milled off in one operation, and the holes are also drilled through arbitrary or fixed points, so that each machine is the counterpart of every other. The hook is also subjected to an ingenious operation on a milling machine, by which the essential curves are reproduced with much exactness.

On page 1, No. 1, Scientific American (last volume), our readers will find an illustration of a new milling machine invented by this firm, which we have met with in all the best shops of the country, and have heard highly praised. This class of tool is indeed indispensable in all well-conducted establishments. From a small beginning a few years ago, Messrs. Brown & Sharpe have built up a flourishing business, and Mr. Brown of the firm is counted as one of the most ingenious machinists in the country. It affords us much pleasure to notice active, go-ahead, driving manufacturers, and we shall speak of other shops we have passed through in our travels at an early day.

Cleansing and Purifying Casks.—The casks in English breweries are all cleansed by machinery. About three gallons of hot water are placed in each cask with a small quantity of sharp gravel, and the machine whirls several casks about at once for from five to ten minutes, when they are emptied. A machine will thus cleanse sixty moldy casks in one hour. Old tainted casks are purified by slightly steaming, and then exposing them to a current of air heated to 450° Fah. Superheated steam of 600° Fah., injected into a moldy cask for about ten minutes will effectually cure it.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

Wind Wheel.—This invention consists, first, in attaching the wind wheel and vane to a frame placed on a circular way and arranged in such a manner that it will rotate under the action of the wind so that the wheel will always be made to face the wind. This arrangement is designed to supersede the revolving head on a fixed post, the usual plan for allowing the wheel to be adjusted to the wind. The invention consists, secondly, in a novel construction and arrangement of the several parts of the wheel, whereby the same is rendered capable of being readily taken apart for repairs or for other purposes. It consists, third, in a novel and improved mechanism for stopping and starting the wheel, and also in an improved governor or regulator for controlling the speed of the wheel, and rendering it uniform under variable velocities of the wind. H. S. Wentworth, of Norvell, Mich., is the inventor of this improvement.

Marine Clock.—This invention is more especially designed for clocks to be used in the engineer rooms of steam vessels. One object is to provide for the winding and the daily setting of the hands, which is necessary at sea, without the greasing and soiling of the dial and inside of the glass, which is almost unavoidable when the winding and setting are performed in front of the dial in the usual way ; another object is to obviate the difficulty which sometime arises at sea from the loss of the ordinary winding key which is difficult to keep in place. And a third object is to avoid the bending or straining of the hands, which so often occurs in setting the clock by taking hold of the hands themselves. The invention consists in certain improved means of winding and setting the hands applied in combination with a hinged dial, whereby the above results are obtained. Victor Giroud, of New York city, is the inventor of the above improvement, and further information may be obtained from Messrs. Davison, Dickinson & Co., 229 Broadway, New York city.

Sewing machine Guide.—This invention consists in the attachment to a sewing-machine guide of a roller having a smooth periphery composed of india-rubber or other gum or soft material of a similar nature, of sufficient length to press the whole width of a tuck, hem or plait, for the purpose of keeping it smooth and preventing it from puckering, and at the same time preventing it from slipping away from the gage. It also consists in the construction of two plates the nippers of which is flexible and elastic, and between which the work passes with a two-edged lip on the lower plate projecting upward and arranged obliquely to the guide, and with a single-edged lip in the upper one projecting downward between the two edges of the lower lip, for the purpose of drawing the work toward the gage ; the two-edged lip also serving, by the greater friction which it produces on the lower thickness of a tuck, fold or plait, to prevent the feeder from moving that thickness faster than the upper one, and so drawing the work and rendering it uneven. W. L. Fish, of Newark, N. J., is the inventor of this improvement.

Boring Machine —This invention relates to an improvement in that class of boring machines in which the spindle is fitted so as to rotate and also slide longitudinally in boxes terminating at the outer ends of two arms which project from one side of an upright or pillar. The invention consists in the arrangement of an adjustable frame forming the bearings for the shaft imparting motion to the bore spindle, and attached to the arms which form the bearings of said bore spindle, in such a manner that by raising or lowering said frame, different sized wheels can be introduced, and the speed of the bore spindle can be accommodated to the size of the drill and to the nature of the article to be drilled. The invention consists also in a treadle with pawl for feeding and bent lever click for arresting and releasing the vertical spring, and which connects with the arms forming the bearings of the bore spindle, in such a manner that by repeatedly depressing said treadle, the drill is gradually fed to the work, and by raising the treadle the spring rod is released and the drill carried back to its original position. G. S. Corwin, of Riverhead, L. I., is the inventor of this machine.

Deck Light.—The ordinary deck lights for iron-clad vessels are hinged at the lower end of a tubular case which is fitted in the planking of the deck, and as the latter is necessarily quite thick in order to support the iron plating and effectually resist shot, there is a large chamber formed by the case above the light, which catches and holds water at every storm, or when the vessel ships a sea. This water has hitherto been removed by stopping up the same by means of a cloth or sponge, which consumes considerable time. It cannot be removed by opening the light from below, on account of the water being discharged upon the floor of the cabin or apartment underneath. This invention consists in applying a faucet to the lower part of the tubular case, in such a manner that the water may, with the greatest facility be drawn off from the tubular case into a perfect receptacle below the light and within the apartment below the deck. E. S. Hidden, corner of avenue C and Twelfth street, New York city, is the inventor of this deck light.

Thread oiler for Sewing Machines.—This invention consists in a box of cylindrical or other suitable form provided with an opening for the reception of a sponge or its equivalent, an oil hole for the introduction of oil or other lubricating matter without removing the sponge, and a narrow slot into which the thread may be slipped to cause it to work through or in contact with the lubricated sponge, and from which it may be slipped when desired without unthreading the needle, such box to be attached to the needle arm or other convenient part of a sewing machine between the spool and the needle. It also consists in providing the so constructed box with a clasp by which it may be readily attached to the needle arm or needle operating lever, or other suitable part of a sewing machine, without the aid of screws or other separate fastenings. And it further consists in so arranging the opening for the reception of the sponge that it may be closed to confine the sponge in the box by the attachment of the box to the machine. O. R. Hyde, East Cleveland, Ohio, is the inventor of this improvement.

Fluid Meter.—This invention consists in the employment of a movable weight guided by an oscillating slide which connects with one of two valves that are balanced on a suitable working beam to change the current of the fluid, and moved by the action of the fluid on a flexible or movable diaphragm, in such a manner that, by the motion of the weight produced by the action of the fluid on the diaphragm, the valves are alternately closed and opened, and the current of the fluid changed to act alternately on one and then on the other side of the diaphragm, and the quantity of fluid admitted to either side of the diaphragm is registered by the motion of the working beam from which the valves are suspended, said motion being transmitted by suitable mechanism to a registering apparatus, so that the quantity of fluid passing or having passed through the meter can be ascertained at any moment. John Sheffield, of Pultneyville, N. Y., is the inventor of this improvement.

Paper File.—This invention consists in the arrangement of two round, square or polygonal rods, one being provided with springs which press against the surface of the other, or against one or more papers placed between the two rods or rollers, and firmly connected to two arms, each provided with a series of holes to form the bearings for the second rod or roller, in such a manner that by adjusting the movable rod or roller in the corresponding sockets of the arms, a larger or smaller quantity of papers can be secured between the two rods or rollers, and the papers thus secured can be read or handled with the greatest ease and convenience ; the invention consists also in the arrangement of a movable longitudinally sliding spring gudgeon in one end of the movable roller, in such a manner that by subjecting said roller to a strain or pressure in a longitudinal direction, said spring gudgeon is caused to recede, and the roller is allowed to be taken out or put into the several sockets of the arms with ease and facility. Samuel Thompson, of San Pedro, Cal., is the inventor of this paper file.

AT Mechanic's Falls, Me., paper is made from a mixture of rye straw and corn shucks.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING NOVEMBER 3, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

40,451.—The Preparation of Yeast.—J. T. Alden, Cincinnati, Ohio. Antedated Oct. 20, 1863 :

I claim the process herein described of making or preparing granulated yeast, wherein the substance is reduced, while in a plastic condition to a finely divided or granulated state, and in that form is dried and preserved for use, substantially as set forth.

40,452.—Car Springs.—T. F. Allen, Canandaigua, N. Y.:

I claim the construction of a metallic conical car sping, with spiral coils, B, which have bearing surfaces and given spaces between them which close and open, and by means of closing and opening the spiral coils are protected and the spring is graduated, substantially as described in my specification, and for the purpose set forth.

40,453.—Shield for Ordnance.—Peter Andrew, Cincinnati, Ohio :

I claim the elliptic, funnel-shaped, protecting shield, substantially in the manner and for the purpose herein set forth.

40,454.—Sugar Mold Carriage.—Thaddeus Beach, New York City :

I claim the combination with jaws, D D', set in the same horizontal plane of bars, C C', for communicating simultaneous motion to the respective jaws, racks, a a', attached to the said bars, and the pinion, E, for imparting motion thereto, when all the said parts are constructed and arranged in the manner and for the purpose herein specified.

[This invention relates to a new and useful improvement in sugar mold carriages, such as are employed for conveying filled sugar molds to the drying department in sugar refineries. The invention consists in a novel and improved means for grasping or holding the tops of the molds in the carriage, whereby the carriage-way can, with the greatest facility, be adapted for holding different sized molds.]

40,455.—Paddle Wheel.—A. T. Boon, Galesburg, Ill.:

I claim the combination of the double-sided buckets, A A, with the arms, B B, of my improved paddle wheel, by means of the metallic side plate, c c, embracing loops, g g, and wedged elastic strips, E E, or their equivalents, substantially in the manner and for the purpose herein set forth.

I also claim in combination with the above feathering automatically the pivoted sides, b b, of my improved paddle buckets, A A, in the revolution of the wheel by means of projecting rods or pins, m m, upon said pivoted sides, and a suitable curved bearing surface, G, upon the side of the vessel, substantially in the manner and for the purpose herein set forth.

40,456.—Tile Machine.—John Braislin, Burlington, N. J.:

I claim, first, The reciprocating plunger, M, space, N, and forming plate, P, in combination with a mixing reservoir, and the opening, m, at the bottom of the same, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The mixing reservoir, C, and vertical shaft, F, with its plate, k, in combination with the said opening, m.

Third, The vertical cranked shaft, F, rod, H, lever, I, rod, K, and plunger, M, the whole being arranged for joint action, substantially as set forth.

Fourth, The opening, x, at the rear of the plate, P, in combination with the bar, Q, and block, y, or other equivalent movable cover for the said opening.

40,457.—Dish-washing Machine.—A. M. and J. I. D. Bristol, Detroit, Mich.:

We claim, first, the reciprocating plates, K K, arranged substantially as shown, within a suitable box or reservoir, C, and provided with brushes, L, substantially as and for the purposes herein set forth.

Second, Providing the brush plates, K K, with openings, d, having beveled edges, e, substantially as shown for the purpose of throwing the water upon the dish by the action of the plates as specified, and freeing the hair of the brushes from grease.

Third, The rotary brush disks or wheels, T T, arranged as shown within the box, C', and provided with points or arms, n, having beveled edges to operate as and for the purpose set forth.

Third, The plates, M V, placed respectively between the brush plates, K K, and brush disks, or wheels, T T, and connected substantially as shown, with the levers, P P, for the purpose herein described.

[This invention consists in the employment and use of reciprocating brush plates and rotary brush disks, placed within suitable boxes, and arranged to operate in such a manner as to perform the work of washing dishes, such as plates and similar flat dishes, with great rapidity and in a thorough and efficient manner.]

40,458.—Cars for Petroleum.—John Clark, Canandaigua, N. Y.:

I claim the application of a tank, D, under the platform, A, of a railroad car, substantially as and for the purpose specified.

[This invention consists in the application of a tank of sheet metal or other suitable material under the platform of an ordinary railroad car, in such a manner that a large quantity of petroleum can be carried in bulk, and at the same time the car can be used in its ordinary capacity as a package or dirt car.]

40,459.—Boring Machine.—G. S. Corwin, Riverhead, N. Y.:

I claim, first, The vertically adjustable frame, H, in combination with the bevel gear, E F, and bore spindle, D, constructed and operating as and for the purpose specified.

Second, The combination of the treadle, o, pawl, p, bent lever click, r s, ratchet wheel, q, and vertically sliding rod, L, with the bore spindle, D, all constructed and operating in the manner and for the purpose substantially as shown and described.

40,460.—Pans for Evaporating Sugar, &c.—C. B. Darrow, Orland, Ind.:

I claim a sugar pan provided with cavities, c, at or under the alternating ends of the partitions, a, substantially as shown and described.

[This invention consists in the arrangement of cavities on the opposite side of the pan, and under the several partitions alternately at one end then at the opposite end, in such a manner that the scum rising in one compartment or groove is not allowed to pass into the next compartment without interrupting the current of the juice from one end of the pan to the other, and at the same time the sediment forming at the bottom of the passages between the compartments is

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not allowed to interrupt the current of sirup neither is it permitted to mix with the sirup and to impede the granulation of the sugar.]

40,461.—Covers for Baking Pans.—W. C. Davis, Cincinnati, Ohio:

I claim the corrugated Dutch oven cover, A B b b′, substantially as set forth.

40,462.—Apparatus for Dating Railroad and other Tickets.—J. B. Edmonson and James Carson, Manchester, England:

We claim the improved dating or stamping press, as not only provided with a swing frame, m, and a striking plate or striker, l (to operate together and with the type as described), but as having an inking roller, e, applied to the press frame and striking plate, substantially as and so as to be operated by the latter as specified.

We also claim the combination and arrangement of the elastic cushion or pad, d, with the type or printing surface, and the striking plate, l, applied to, and so as to be operated by a swinging frame, m, substantially as specified.

We also claim the improved dating press as made, not only with the swing frame, m, the striking plate or striker, l, and an inking roller, e, arranged and combined together and with type or its equivalent, as specified, but as provided with an inking apparatus or surface, for inking the type, so arranged as to be passed over by or in contact with the roller during its movement away from the type.

We also claim the inking apparatus as made of the porous or absorbent bed or inker, k, the ink receptacle, h, and the screw, i, constructed, arranged and combined together, and so as to operate substantially as specified.

40,463.—Reaping Machines.—S. A. Cummins, Vienna, N. J.:

I claim, first, The vibrating toothed beams, B B, operating as set forth in combination with the slotted table, A, constructed and arranged in the manner described.

Second, In combination with the slotted table, A, constructed and arranged as described, the column, C, with its eccentrics, p p, for giving motion to the vibrating toothed beams, B B, in the manner and for the purpose set forth.

Third, The curved end of the toothed beams, B B, moving upon the pin, n, in combination with the spring, r, ratchet, q, and catch, q′, or the equivalent thereof, for giving the required motion to one end of the toothed beams, B B, substantially as set forth.

40,464.—Guide for Sewing Machines.—W. L. Fish, Newark, N. J.:

I claim the arrangement of an india-rubber roller in combination with the gage plate, k, substantially as herein specified.

40,465.—Cooking Stoves.—J. D. Flansburgh, Philadelphia, Pa.:

I claim the application to the oven of a cooking stove of a transparent plate, a′ in combination with a protecting outside shutter, a3, the same being arranged to operate in the manner described, for the purposes specified.

40,446.—Curtain Fixture.—A. C. Flink, Boston, Mass.:

I claim the combination of the spring with the roller and its bracket, substantially in manner and so as to operate therewith as specified.

40,467.—Grinding Mills.—J. A. Forsman, Jamestown, Ohio:

I claim so hinging the curbs or cases, B C, which contain the buhrs, as that, by the removal of the fastenings and the conveyor case and spindle, they may be opened outwardly in opposite directions, thereby bringing the faces of the buhrs into a convenient position for dressing, substantially as described.

Second, I claim the combination of the hollow cylindrical box, m, set screws and thrust bolt, r, constructed and arranged, substantially as and for the purpose described.

Third, I claim the combination of the adjustable or pivoted driver d, with the tram screws, s′ s′, by which the runner or revolving buhr is easily trammed or set at right angles to its axis of motion, substantially as specified.

Fourth, I claim the combination and arrangement of the conveyer, z, curb or case, B, tram screws, s s, and the stationary buhr, B′, when constructed and arranged substantially as described, and for the purposes set forth.

40,468.—Constructing Hollow Projectiles.—Samuel Gardiner, Jr., New York City:

I claim constructing shells for fire-arms by forcing the metal into the mold around an internal shell, B, supported on a mandrel, F, all as herein before described.

40,469.—Burglar's Alarm.—M. E. Genung, Granville, Ohio:

I claim the combination of the bridge with the alarm and bell and hole, W, in bell for the purpose of winding up the alarm, substantially as and for the purpose specified.

I also claim the combination of the attachments, F G and H, in combination with pin, K, and plates, I and J, and hooks, D, substantially as and for the purpose specified.

40,470.—Manufacture of Steel.—William Gerhardt, New York City:

I claim the method of converting wrought and cast iron into steel in the manner and for the purposes above specified.

40,471.—Anti-friction Roller Journal Bearings.—Enos Turner (assignor to W. S. Johnson, Jr.) Chicago, Ill.:

I claim the combination and arrangement of the metallic frictional casing, B, the rollers, a, the supporting shafts, c, and circular frames, C, when said shafts are provided with shoulders to prevent the frames, C, from pressing against the ends of the rollers, and are provided at each end with heads countersunk in said frames, C, and when the perforations through said rollers are made larger than the shafts, c, so that the friction may be thrown off from the said shafts, c, and come upon the casing, B, and the journal, substantially as herein specified and shown.

40,472.—Purifying Iron and Steel.—William Gerhardt, New York City:

I claim the method herein fully described and for the purposes specified.

40,473.—Harness Pad-former or Mold.—T. H. Girard, Batavia, N. Y.:

I claim the harness pad-former or mold, substantially as and for the purpose described.

40,474.—Marine Clock.—Victor Giroud, New York City:

I claim, first, The pawl lever, I, pawl, e, and ratchet wheel, H, applied to the winding shaft, c, and in combination with a hinged dial to which the works are attached, substantially as herein described.

Second, The spindle, m, pinion, l, and knob, m′, applied in combination with the gearing of the hands and with the hinged dial, substantially as and for the purpose herein specified.

40,475.—Lubricator.—T. W. Godwin, Portsmouth, Va.:

I claim the arrangement and operation of a screw plug valve, F, having threads, a a a, running in one direction, and a combined feeding cup and grinding valve, A A″, having threads, c c c, running in the opposite direction, in connection with an oil cup, substantially as shown and described.

40,476.—Implement for Catching Swine.—Louis Goldsmith and Noah Gregory, Jr., Goshen, N. Y.:

We claim the two jaws, A A′ formed of the hooks, a a′, and shanks, c c′ connected by the pivot, b, in connection with the rack, B, pawl, C, and rope, G, and with or without the pole, F, and gage or set screw, D, all arranged substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a small and efficient device for catching and holding swine for the purpose of dragging or leading them about. The invention consists in the employment or use of two jaws, which cross each other and are connected by a pivot and used in connection with a rack and pawl, a gage or set screw and a rope, all arranged in such a manner as to operate perfectly for the purpose specified.

40,477.—Box for Case-hardening.—James Greene, Providence, R. I.:

I claim a box for case-hardening, constructed with a central opening or flue and a movable discharging bottom, all as herein shown, and described, for the purpose set forth.

[The object of this invention is to obtain a box for case-hardening which will admit of the articles to be operated upon being heated in a more uniform manner than hitherto, and after being subjected a requisite time to the heat in contact with the bone dust or other material used, and then admit of the articles being suddenly and properly precipitated from the box into the water or other liquid which tempers them.]

40,478.—Stump Extractor.—Isaac Hicks, Hartford, Wis.:

I claim the frames, J, provided with wheels, o, and attached as shown to one end of the bed pieces, d, of the framing, A, in combination with the fixed wheels, n, at the opposite ends of the bed pieces, and with the hook, I, composed of a series of plates, h, connected by joints as and for the purpose specified.

[The object of this invention is to obtain a simple and efficient device by which stumps may be readily extracted from the earth, stones and other heavy bodies readily elevated, and the stumps, stones or other bodies when raised, removed from place to place with the greatest facility.]

40,479.—Deck Light.—E. S. Hidden, New York City:

I claim a deck light for iron-clad vessels, provided with a faucet, C, applied to it in the manner substantially as shown, to admit of the water being withdrawn from the chamber above the light at the under side or below the deck, and without opening the glass or light, substantially as herein set forth.

40,480.—Machine for Making Boxes.—S. L. Hill, Williamsburg, N. Y.:

I claim the employment or use, in the manufacture of wooden boxes, of a form, a, provided with thumb screws, d, or their equivalents, and operating in the manner and for the purpose substantially as shown and described.

Also, the combination of the form, a, with the support, b, and the thumb screws, d, or their equivalents, substantially as and for the purpose set forth.

[This invention consists in the employment or use in the manufacture of wooden boxes of a form corresponding in size to the interior of the boxes to be made, and provided with a series of set screws, in such manner that the sides of the box can be readily held in place until the bottom is fastened to them, and their edges are screwed together by nails or in any other desirable manner.]

40,481.—Harvester.—Reuben Hoffheins, Dover, Pa.:

I claim, first, The main frame and gear frame, A A, constructed as described, open at each end, when used in combination with shafts gearing and double driving wheels, arranged and operating substantially as and for the purposes specified.

Second, The flange, a, cast or formed upon the gear frame for the combined purposes of strengthening the latter and protecting the crank shaft, E, as hereinbefore explained.

Third, The movable tongue, K, adapted to be attached to the frame on either side of the wheel, B′, and employed to support or raise the inner end of the beam.

Fourth, Attaching the shoe to the drag bar by a transverse swivel joint to permit the finger beam to turn on its axis to elevate or depress the points of the fingers, or to fold the beam against the frame for transportation, when combined with bracing guides, h′, substantially as herein described.

[This is a valuable improvement in two-wheeled convertible reapers and mowers.]

40,482.—Blower.—Bennet Hotchkiss, New Haven Conn.:

I claim the blades, a a, when the sameare of the form and set relatively to each other in the manner described, and combined with an air chamber, H, inlets, F, and outlet, I, substantially as and for the purpose specified.

40,483.—Planes for Beading, Molding, &c.—S. C. Howes, South Chatham, Mass. Ante-dated Oct. 24, 1863:

I claim as an improved article of manufacture a molding plane, provided with the adjusting nut, C, screw, D, the holding clamp, H, screw, J, and curved throat, e, all constructed and operating together as herein shown and described.

[This invention relates to an improvement in that class of planes used by joiners for forming beads and moldings, and also for forming rebates, and which discharge the shavings at the side of the stock.]

40,484.—Device for Oiling Thread in Sewing Machines.—O. R. Hyde, East Cleveland, Ohio:

I claim as an improved article of manufacture a sewing machine oil sponge box, made as herein shown and described, with an opening, a, to receive the sponge, and clamps, d d, to bind the box against the needle-arm, and close the said openings all as set forth.

40,485.—Water Meter.—F. G. Johnson, Brooklyn, N. Y.:

I claim the peculiar arrangement and combination of the crooked pipe, F, with the meter, C I, substantially in the manner and for the purposes set forth.

40,486.—Harness Snap.—R. W. Jones, Syracuse, N. Y.:

I claim the arrangement and combination of parts specifically as described, and substantially as and for the purposes set forth; that is to say, the spring, B, laid into a recess, E, in the hook, without being applied thereto, and held in place by the pivot of the lip, A, all as herein described.

40,487.—Percussion Cap Holder.—T. B. Lamb, Hamilton, Mich.:

I claim, first, The combination of the revolving circular plate, C C′, with studs, c c c c, the case, A A A A′ A′, and opening, d, the wheel operating substantially as and for the purpose herein set forth.

Second, In combination with such revolving circular plates with their studs and the said case, I claim the box, B, with its cover, B′, substantially as herein described.

Third, I claim the peculiar manner of forming the studs by means of two circular plates fastened together in the center, having notches cut out around their circumference so that one half of each stud is formed from one plate and the other half from the other plate, and they are capable of adjusting themselves to the size of the percussion cap that may be placed upon them, substantially as and for the purpose herein described.

40,488.—Harvester.—S. K. Lighter, Hamilton, Ohio:

I claim, first, In the described combination, the pivot, G, dog, I, spring, K, and trigger, L, or devices substantially equivalent, whereby the tongue of a harvesting machine is rendered laterally limber at the option of the operator and restored automatically to the rigid condition, substantially as set forth.

Second, The provision between a laterally limber tongue, F, and the main frame of a harvester, of the wedge formed socket-block, H, and inclined or adjustable bracket, B, or devices, substantially equivalent.

40,489.—Transferring Prints, &c.—Henry Loewenberg, New York City:

I claim printing or drawing designs or characters on paper or cloth, rendered transparent, in the manner described, and afterwards covering the printed surface with an adhesive substance to adapt the design to be transferred to another surface by moistening the adhesive substance, as hereinbefore explained.

[This invention is valuable for the production of self canceling postage and revenue stamps and unalterable bank notes, for making transfers for engravers and for many other purposes.]

40,490.—Primed Metallic Cartridge.—W. W. Marston, New York City:

I claim the flanged nipple, b, containing the detonating material, in combination with the cartride-case having a perforated base for the passage of said nipple, as specified,

40,491.—Restoring Waste Rubber.—T. J. Mayall, Roxbury, Mass. Ante-dated Oct. 29, 1863:

I claim the process or means, as herein described by which sulphur or fibrous materials or either, which have been combined with india rubber or gutta percha separately, or combined, before being subjected to the process of vulcanization and whether vulcanized rubber articles or not, by subjecting the same to the flame of inflammable liquids or gases, such as spirits of turpentine, camphene, petroleum or carbon oil, alcohol, benzine, benzole, naphtha, or any other inflammable liquids or gases producing the same result, substantially as set forth.

40,492.—Corn Planter.—Asher Merwin and C. H. Hobart, Padua, Ill.:

We claim the frame, D, pivoted to vertical bars, d, attached to the front part of the frame, A, of the machine, when said frame is arranged with or raised and lowered by means of the toggle, J, rod, L, and lever, M, substantially as herein set forth.

[This invention consists in a novel and improved combination of a mounted frame, plows, and a seed-planting device, whereby corn may be planted and also plowed or cultivated when the plants are in a growing state and of suitable hight, and the machine be under the perfect control of the operator.]

40,493.—Clothes Dryer.—C. G. Miller, Brattleboro', Vt.:

I claim the arrangement of the plate, C, and adjusting nut, c, with the screw bolt, b, bars, D, and lips, a a′, all in the manner and for the purpose herein shown and described.

[This invention relates to an improved clothes bar, such as are provided with a series of adjustable arms, and are designed to be attached to the wall of an apartment and hold clothes after being rinsed, or to hold the wearing apparel of the occupant of a sleeping room.]

40,494.—Water Wheel.—George Mullikin, Littleton, N.H.:

I claim the combination of the horizontal plates, e, with the backs of the buckets, B, substantially in the manner herein shown and described, whereby the water is made to act with its full force upon the faces of the buckets, and is prevented from re-acting against the backs of the buckets, all as set forth.

I also claim the arrangement of the segment plate, J, with the pivoted gate, H, and shaft, I, in the manner herein shown and described.

[This invention consists in a novel manner of applying the water to the wheel, whereby the water is made to strike each and every bucket in a solid unbroken sheet or column over the entire circumference of the wheel, and to act with nearly equal force whether the gate be wholly or partially open.]

40,495.—Grain Drill.—H. B. and G. A. Myers, Schoolcraft, Mich.:

We claim, first, The semicircular lever, O, applied to the seed box, E, as shown, when said seed box is arranged or fitted in the frame, C, as and for the purpose specified.

Second, The drill teeth, I, provided with dovetails, J, on their upper ends, to fit in corresponding recesses in the back of the bar, D, to secure the box, J, to the seed box, E, as set forth.

[This invention relates to a new and improved seeding machine which may be advantageously used for sowing seed either broadcast or in drills, as may be required.]

40,496.—Soda Water Fountain.—Theophilus Ogden and Joseph Hindermeyer, Philadelphia, Pa.:

We claim, first, providing a soda water fountain of any form equivalent to the one herein described, with an inwardly-arched bottom, B, forming a receptacle for ice beneath the soda-water chamber.

Second, The use of an elastic, self-tightening bottom, H, in connection with the described receptacle for ice, substantially as and for the purpose herein set forth.

40,497.—Grain Drill Teeth.—Isaac H. Palmer, Lodi, Wis.:

I claim a drill or cultivator tooth-jointed at or about its mid length, to permit it to yield backward in the event of striking an immovable obstacle and provided with a spring attached directly to the tooth independently of the frame, for the purpose of throwing the tooth forward to its operating position when released, substantially as herein described.

[This is a simple and effective device to permit a drill or cultivator tooth to yield to pass an immovable obstacle, and automatically restore it to its working position.]

40,498.—Construction of Cannon and Fire-arms.—N. A. Patterson, Kingston, Tenn.:

I claim the process of constructing or strengthening ordnance or other fire-arms by coiling sheets of different metals, adapted to fuse at different temperatures, upon or around a mandrel or cylinder, or the barrel or breech of the gun and uniting the coils of harder metal by the fusing of the softer metal, substantially as hereinbefore explained.

40,499.—Horse Power.—J. N. Pease, Panama, N. Y.:

I claim the wheel, B, provided with V-shaped teeth, b, in combination with the pallet, C, lever, D, and the rods, E G, and levers, F, or their equivalents, all arranged to operate substantially as and for the purpose herein set forth.

[This invention relates to a new and improved horse power, designed for operating or transmitting power to that class of machines which work with a rectilinear reciprocating movement, such, for instance, as reciprocating saws, churn dashers, &c.]

40,500.—Ladder.—W. G. Philips, Newport, Del.:

I claim curving or bending out the sides, b, of a ladder, substantially as and for the purpose shown and described.

[The object of this invention is to construct a ladder which can be used as an ordinary or as an extension ladder, or step or prop ladder, as occasion may require.]

40,501.—Machine for Grinding Ores and Amalgamating Precious Metals.—John G. Randall, Canon City, Colorado:

I claim the stationary die, D, secured within a stationary pan, B, in combination with the revolving die, E, provided with furrows, e, and secured within the pan, F, having the tube, H, attached to it, the pan, B, being arranged as shown, to admit of a quicksilver receptacle, b, into which the rim, a′, of the pan, F, projects, substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a device by which gold and silver ore, and particularly quartz pulp or tailings from a stamp mill, may be pulverized, and the metal it contains thoroughly amalgamated.]

40,502.—Head Block for Saw-mill.—E. B. Requa, Jersey City, N. J.:

I claim, first, The employment or use of two screws, J J′, connected by a clutch, K, arranged as shown or in any equivalent way, in combination with dogs, N N′, connected with the screws, through the medium of nuts, M M′, and arranged substantially as shown, to admit of the simultaneous adjustment of both dogs, N N′, and the separate adjustment of one dog, N, when required for the purpose herein set forth.

Second, The two bars, H H, attached to the bar, G, and fitted in grooves, a′, in the sides of the nuts, M M′, as and for the purpose specified.

Third, The attaching of the upper dog, N, to its nut, M, by means of a screw, g, passing through a vertical slot, h, in the dog, for the purpose of admitting of a vertical adjustment of said dog, as described.

[The object of this invention is to obtain a head block of simple construction which will admit of crooked timber, such as ship timber, for instance, being dogged in proper position with the greatest facility, and also admit of timber being easily dogged so as to be re-sawed or divided into two longitudinal parts, as well as being dogged for cutting into boards or planks of any desired thickness.]

40,503.—Fire-place Stove.—Joseph Schmedinghoff, Cincinnati, Ohio:

I claim the arrangement of the fire-place, C, draft passages, E, ventilating chamber, F, chest, I, pipes, K, chimney, J, and dampers, H L, the whole being combined and operating as described.

40,504.—Fluid Meters.—John Sheffield, Williamson, N.Y.:

I claim, first, The weight, K, and tilting guide, L, in combination with the diaphragm, F, valves, H H′, rock shaft, I, and registering apparatus, M, constructed and operating in the manner and for the purpose substantially as shown and described.

Second, The tappet, p, hinged to the side of the tilting guide, L, and operating in combination with the weight, K, double-hooked catch, p^3, and dogs, p^4 p^5, substantially as and for the purpose set forth

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40,505.—Grain Separator.—N. H. Sherburne, Elgin, Ill. Ante-dated Oct. 24, 1863 :

I claim, first, Suspending the shoe or riddle frame on bent springs, for the purpose and substantially in the manner set forth.

Second, I claim, in combination with a shoe vibrated within the sides of the frame, the connecting of the upper ends of the springs to the outside of the frame and uniting their lower ends to the shoe through slots in the sides of the main frame, substantially as described.

Third, I also claim the bar, o, with its supports and holding mechanism, for the purpose of raising the nest or series of riddles, or lowering them in a body for the purpose and in the manner substantially as set forth.

I also claim the long riddle, G, arranged and operating with regard to the delivery points, r s t, and having a shake motion communicated to it, substantially in the manner and for the purpose described.

40,506.—Apparatus for making Plumbago Crucibles.—William Smith, Pittsburgh, Pa. :

I claim making plumbago crucibles in the manner substantially as hereinbefore described, by means of a mold attached to a revolving wheel or disk, and a former revolving freely on a non-revolving spindle attached to a slide rest, susceptible of two motions, one parallel to the axes of the mold, and the other at right angles thereto.

40,507.—Manufacturing Boxes.—John Sperry, New York City :

I claim, first, a grain-bound box made of bottom pieces, a a′ b b′, and bands, c, which are so arranged in relation to each other that the grain of one layer crosses the grain of the adjacent layer, substantially as specified.

Second, Making the bottom and the sides of a wooden box either partially or wholly out of one and the same piece of material by turning the edges up or in, as set forth.

[The object of this invention is to produce a grain-bound box by combining several thin layers of wood in such a manner that on every part of the box the grain of one layer runs in a different direction to that of the adjacent layer or layers.]

40,508.—Time-keeper.—James Stephenson, Canandaigua, N. Y. :

I claim, first, Operating the pallet or escapement by an elastic or yielding lever, so constructed and applied that it will be actuated by the forward motion of the balance wheel and permit its free return, substantially as explained.

Second, The employment or use of a beveled pin, b′, in combination with the yielding lever, H h, for the purpose specified.

[This is a simple and efficient form of escapement, uniform in its action and possessing great durability.]

40,509.—Valve for Steam Engines.—F. B. Stevens, New York City .

I claim a slide valve connected with a passage made midway in the length of a cylinder and made to bear alternately with its opposite faces against two seats, as herein set forth and described.

Second, In connection with my first claim, placing a greater number of openings in one seat than in the other as a means of diminishing the throw of the valve without decreasing the size of the passage way, as herein set forth and described.

40,510.—Condenser for Steam Engines.—F. B. Stevens, New York City :

I claim, first, Condensing the steam discharged from the cylinder of a steam engine by the first eduction by delivering this steam into the hot well of the engine, in the manner herein described.

Second, The application and use to, and in the supplying of a cooler with water heated in the hot well by the steam discharged from the cylinder by the first eduction, in the manner herein described.

Third, In connection with delivering the steam discharged by the first eduction into the hot well, the arrangement of the pipe for drawing off the water from the hot well into a cooler, and also the arrangement of the pipe for drawing off the water from the hot well into the atmosphere, and also the arrangement of the shifting valve, or its equivalent, in the manner herein described.

40,511.—Wood-molding Machine.—John Stock, New York City :

I claim the arrangement of attaching the pattern or template, H, to elastic bars or their equivalent, in such a manner that the same will allow the required motion to the pattern plate, for the purpose substantially as described and set forth.

40,512.—Folding Chair or Lounge.—Joseph Luther, New York City :

I claim the folding bottom, c d e, formed as specified, in combination with the swinging back, f, and braces, g, as and for the purposes specified.

I also claim the swinging arms, h, in combination with the brace, k, fitted as and for the purposes specified.

40,513.—Folding Table.—Joseph Luther, New York City:

I claim the folding pairs of legs, b b and e e, hinged to the table and folding as specified, in combination with the feet pieces, h h, for the purposes specified.

I also claim retaining the legs, fitted to fold as specified, when the table is open, by means of spring latches applied and acting as set forth.

40,514.—Machine for Cutting Nails.—W. A. Sweet, Syracuse, N. Y. :

I claim the formation of two nail blanks, brads, or spikes, substantially identical in form and dimensions by one operation of a punch working in combination with a corresponding double-cutting die, whereby also the turning of the nail plate or bar is completely avoided.

40,515.—Paint for Ships' Bottoms.—J. G. Tarr and A. H. Wonson, Gloucester, Mass.:

We claim the composition prepared substantially as herein set forth and for the purpose specified.

40,516.—Machine for filling Bottles.—W. M. Tate, Zanesville, Ohio :

I claim the arrangement and combination of the spring, lever, plunger and cylinder described, and the other parts of the machine by which the effect is produced, substantially as set forth.

40,517.—Inkstand.—Jesse G. Thompson, Carbondale, Pa.:

I claim the placing the ink chamber, B, and the ink cup, D, in opposite sides of the inkstand and connecting them with the passage ways, C and E, as herein described, for the purpose set forth.

40,518.—Paper File.—Samuel Thompson, San Pedro, Cal.:

I claim, first, The arrangement of the rod, A, with arms, B, sockets, a, and springs, in combination with the adjustable rod, A′, constructed and operating as and for the purpose shown and described.

Second, The longitudinally sliding spring gudgeon, b, in the end of the adjustable rod, A′, to operate in combination with the arms, B, projecting from the ends of the rod, A, substantially as and for the purpose specified.

40,519.—Solar Time-piece.—Theodore R. Timby, Saratoga, N. Y.:

I claim, first, A revolving hemispherical map, A, in combination with a stationary index, F, substantially as and for the purpose specified.

Second, A revolving clock-face or dial, E, in combination with the map, A, and stationary index, F, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in the arrangement of a revolving dial in combination with a map representing a polar projection of one of the hemispheres, and with a stationary index in such a manner that the culminating time of the sun on any part of the globe, and also the difference of time between different localities, can be observed with ease and facility.]

40,520.—Preparing Jute Twine.—James P. Traverse, New York City :

I claim the application of the above sizing and finishing to jute lines for the purpose of a substitute for cotton wrapping twine.

0,521.—Washing Machine.—P. S. Ward, Millville, Iowa :

I claim the combination of the semi-cylindrical tub, A, strips, E, swinging frame, G, and stationary and vibrating racks, F and I, when the said racks are formed of angular bars, f and i, presented edgewise with the bars, i, opposite the spaces between the bars, f, and all the parts are constructed and arranged to operate in the manner and for the purposes specified.

[By this invention the vibration of a pivoted rack is made to force the clothes through the water, squeeze them and constantly change their position, so as to cleanse them thoroughly and quickly with little labor and without injury.]

40,522.—Clinching and Nipping Tool.—E. Warren, Marshall, Mich. :

I claim the combination of the nippers, c c, and projections, d f, on the short arms, b b′, of the pivoted crossed levers, A A, substantially as shown and described, to form a combined clinching tool and nippers, for the purpose herein set forth.

[This invention consists in a combination of a clinching tool and nippers, so constructed and arranged that the horse-shoe nails may, when a shoe is applied, be clenched on the hoof of the horse without the aid of a hammer, and old nails readily withdrawn from the hoof in detaching a shoe therefrom.]

40,523.—Boiler Feed Regulator.—Wm. Webster, Morrisania, N. Y. Ante-dated Oct. 25, 1863 :

I claim, first, The combination of the traversing bar, pawl and expansive tube, as arranged, constructed and operated, substantially as described and for the purpose set forth.

Second, I claim in combination with the water regulator an alarm, when arranged, connected and operated as described and for the purpose set forth.

40,524.—Side Saddle Tree.—Charles Wellman, New York City :

I claim the saddle tree or body, for side-saddle, formed of sole leather, with the metallic straps applied thereto as specified.

40,525.—Wind Wheel.—H. S. Wentworth, Norvell, Mich.:

I claim, first, The frame, C, with wind-wheel and vane attached and applied to the platform, A, to rotate thereon and keep the wheel properly presented to the wind, substantially as herein set forth.

Second, The manner of constructing the wind-wheel as herein set forth, to-wit: By means of the radial arms, H, braced by the segment bars, I I, with the latter passing through the sails, J, substantially as and for the purpose herein set forth.

Third, The supplemental sails, E, applied to the wind-wheel and connected with the sliding head, G′, as shown in combination with the sails, J, also connected to the head, G, and all arranged to operate as and for the purpose specified.

Fourth, The sliding head, G′, placed on the shaft, F, and connected with the sails, J and E, and the lever frame, O, for the purpose of stopping and starting the wind wheel as set forth.

40,526.—Folding Chair.—A. D. Whitmore, Housatonic, Mass.:

I claim the combination of the frame, b b, with the legs and rounds and the frame, a a, the braces, c c, the guide, d, and latch, e, substantially as and for the purpose specified.

40,527.—Cooking Stove.—Charles F. Whorf, St. Louis, Mo.:

I claim the combination of the ovens, c c and I, and water tank, E, with the furnace, B, when constructed substantially as described and forming the substantial parts of a cooking apparatus as set forth.

40,528.—Safety Pocket.—Asa Wilmot, New Haven, Conn.:

I claim a pocket protected at its mouth in the manner described of an elastic cord or band combined with a metallic stay, substantially as specified.

40,529.—Corpse Preserver.—Barton Wilson, Morristown, N. J.:

I claim the arrangement of a double air channel, B B′, the channel B′, surrounding the channel, B, and communicating with it through a series of holes, a, and both channels surrounding the body-chamber in combination with an air passage, f, leading to the ice-box, D, and through holes in the sides of the ice box and channel, C, to the air channels, B B′, all as and for the purpose herein shown and described.

[This invention consists in the arrangement of a double air channel one surrounding the other and communicating with each other through a series of holes, both air channels passing around the body chamber on all sides except the front, in combination with an air-passage admitting air from the outside to the ice box and through holes in the sides of the ice box to the air channels, in such a manner that a continuous circulation of cold air is effected around the body chamber, and the temperature in the interior of said chamber can be brought down to and kept at a low degree with little trouble and with a comparatively small expenditure of ice.]

40,530.—Skeleton Skate.—Henry Wilson, Binghamton, N. Y.:

I claim, first, The cramp, D, combined with springs and points as described above, and for the purposes set forth herein.

Second, I claim the hook with the screw and thumb nut, or their equivalent, for assisting the springs, in securing the whole to the foot, as above described.

40,531.—Washing Machine.—H. R. Winchell, Plainville, Wis.:

I claim the arrangement of the rock-shaft, C, arms, d, bars, f, inclined bars, j, and rubber bars, g i, with the box, A, and inclined rack, B, in the manner herein shown and described.

[This invention consists in the employment or use of a suds-box provided with a curved bottom, in connection with an inclined rack and an oscillating beater; all being constructed and arranged in such a manner that the clothes will be operated upon in the most efficient manner and thoroughly cleansed with a moderate expenditure of power or labor.]

40,532.—Grate for Furnace.—Andrew Winterburn, Albany, N. Y.:

I claim, first, The manner of fitting the shaft, E, in the frame, B, as shown and described, to-wit, by means of the tubular projections, C D, the latter, D, being formed of two parts, e e′, connected by the screw, j, all so arranged that the bearings of the shaft, E, are made to serve as journals for the dumping frame, B.

Second, The combination of the shaft, E, and heads, H, with the revolving frame, B, and teeth or projections, a a, constructed and operating substantially as and for the purposes described.

[This invention consists in the employment or use of a rotary shaft provided with a series of heads of circular or other suitable form and arranged in such a manner as to thoroughly sift the ashes from the fire by the rotation of the shaft and bearing. The invention also consists in combining with the rotary ash-sifting device above mentioned, a fire dumping contrivance, the same being composed of a rectangular frame provided with teeth and having the ash-sifting device fitted within it in such a manner that the dumping contrivance or apparatus may be tilted when necessary or desired, without interfering in the least with the ash-sifting device.]

40,533.—Pack Saddle.—Frank P. Woodcock, New York City :

I claim, first, The herein described manner of suspendening burdens from a pack saddle, substantially as set forth.

Second, I claim the arrangement of the posts, F, attached to the pommel and cantle of a pack saddle, in combination with the straps, a, to support the load or burden, and the manner of bracing said posts, so as to bring the strain of the weight near the center of the saddle-tree, as described.

Third, I claim the forward and after guide-straps, H, for the purpose specified.

Fourth, I claim in combination with the above arrangement, the pads, M, for the purpose described and set forth.

40,534.—Machine for Cutting Files.—Theodore Burr (assignor to himself and Isaac C. Mott), Battle Creek, Mich.:

I claim, first, A file cutting machine constructed with inclined ways, a′ a′, inclined chisel stock, b, adjustable power spring, f, and a rotating bed, B, all arranged substantially as described.

Second, In a file cutting machine the combination of a rotary bed, B, feed roller, m, and spring pressure roller, m′, and inclined cutter stock, b, substantially as described.

Third, Arranging the spring pressure roller, m, at an intermediate point between the rolling bed, B, and the feed roller, m, substantially as described.

Fourth, Cutting or producing the abraded surface upon the broad sides of files upon a cylindrical rotating bed, substantially as described.

Fifth, The combination and arrangement (with the system of mechanism which actuates the chisel and the roller bed), of the roller bed, the inclined chisel and the spring regulating device, all constructed and operating substantially as described.

40,535.—Monitor Turret.—Michael H. Collins (assignor to himself, Geo. Butterfield & Wm. A. Richardson), Chelsea, Mass.:

I claim the improved battery, for tor monitor turret, as constructed of a series of annular segments made, arranged and confined together substantially in manner as represented in the accompanying drawings, and as hereinbefore specified.

I also claim a turret as so made, and having felt or other suitable non-vibratory or non-resonant material interposed between the layers of annular segments, substantially as and for the purpose as specified.

40,536.—Tobacco Pipe.—Frederick Fickey, Jr., (assignor to Wm. H. Fickey), Baltimore, Md.:

I claim so arranging the smoke passages of a tobacco pipe in combination with distinct receptacles for nicotine and saliva, that these fluids respectively will be received and retained in separate vessels, and be prevented from mingling together, or being drawn into and through the pipe stem, the arrangement and construction being substantially as described and represented.

40,537.—Galvanic Battery.—Edwin J. Frazer, Chicago, Ill., assignor to himself, and E. W. Hazard, Galesburg, Ill.:

I claim, first, The cap, a b c, and cover, C, in combination with each other and with the zinc, B, and jar, A, substantially as and for the purpose herein set forth.

Second, The stud, i, insulating sheath, j, and spring, h, applied in combination with each other and with the metal ring, c, of the cap, a b c, or its equivalent, substantially and for the purpose herein specified.

[This invention consists in a certain construction of a galvanic battery whereby the following advantages are obtained, viz:—first, The jaws are enabled to be hermetically sealed to prevent the evaporation of the solution and the crystallization of the salts on the outside; second, Provision is made for the removal of the zincs without disturbing any other portions of the battery; and third, A current is enabled to be kept up in a series of jars when one or more of the zincs are removed.]

40,538.—Explosive Shell.—Halvor Halvorson, Cambridge, Mass., assignor to Charles Spear, Boston, Mass.:

I claim, first, The exterior explosive chamber lying exterior and around the central passage, and in combination therewith and with the mouth and air openings and passages for producing rotation, of the shell as herein set forth.

Second, I claim the cap, h, in combination with the explosive chamber, g, as and for the purposes herein described.

40,539.—Pontoon Boat.—Enoch Harrison (assignor to himself and Edward W. Serrell), New York City. Ante-dated Oct. 29, 1863 :

I claim the mode of retaining the floor planks beneath the thwarts, g g, by the metallic straps, h h, and bolts, 2 2, in combination with the removable side and end pieces of the boat as set forth.

40,540.—Repeating Ordnance.—Ebenezer C. C. Kellogg, Hartford, Conn., assignor to himself and James C. Campbell, New York City :

I claim, first, The combination with a series or system of many chambered slides, G G, of two connected barrels adjustable upon the carriage in such manner that either may be brought to the operative position and used while the other is cooling, substantially as herein specified.

Second, Combining the barrels with the carriage by means of a sliding plate, C, constructed with rings, D D, to embrace the two barrels in such manner as not to interfere with their longitudinal expansion.

Third, The pawl carrier, H, furnished with two pawls, k l, and applied in combination with the ratchets on the many chambered slides, G G, and with the hand lever, I, substantially as and for the purpose herein specified.

Fourth, The cocking lever, N′, and its dog, N, applied and arranged in combination with the hammer, J, and hand lever, I, substantially as and for the purpose herein specified.

Fifth, The letting off lever, P, furnished with a tongue, P2, and spring, P3, applied in combination with the trigger, p, and the hand lever, I, substantially as and for the purpose herein specified.

Sixth, The stop lever, R, and stop pin, v, applied in combination with the many chambered slides, G G, and with the hand lever, I, pawl carrier, H, and pawls, K L, substantially as and for the purpose herein specified.

Seventh, The combination of the jointed bars, S and T, the toothed sector, T′, and endless screw, V, substantially as and for the purpose herein specified.

[This invention relates to the use in combination with a stationary barrel of a series of many-chambered slides moving transversely to such barrel, for the purpose of effecting a rapidly repeated fire through such barrel. It consists first in the employment in combination with a series of such slides of two connected barrels arranged side by side, and so applied and operated that either of such barrels may be brought to the position for use and that each after having had several rounds fired through it may be cooled while the other is in use. It also consists in certain improved means of producing the necessary movements of the many-chambered slides to present these chambers in succession opposite the stationary barrel, and of cocking and letting off a hammer to produce the explosion of the charges in the chambers as they severally arrive opposite to the barrel. And it further consists in certain improved means of adjusting the elevation of the piece.]

40,541.—Iron Railway Chair and Cross Tie.—Loomis G. Marshall (assignor to himself and Andrew Cochran), Philadelphia, Pa.:

I claim the square-shaped double-grooved chair with its elastic rubbers, as herein described.

I also claim the arrangement and combination of the rail chair and tie, arranged, constructed and keyed together as herein described, and for the purposes set forth.

40,542.—Roofing for Buildings.—Luke S. Mills, New York City, and Charles Hart Smith, Baltimore, Md.:

We claim a roofing composed of a lower layer of felt or sheathing paper and a top layer of some rigid substance, the two being firmly connected by an intermediate layer of cement.

40,543.—Directing Projectile.—S. H. Noble (assignor to himself, Joseph Goodrich, Charles Goodrich, and Wm. M. Wooley), Prairie Du Chien, Wis.:

I claim causing a projectile after leaving the gun to describe the arc of a circle in its flight, substantially as herein delineated and set forth.

Second, I claim causing the projectile to describe the arc of a circle after leaving the gun, until it reaches any required point in said arc, and then to move on in a tangent line to said arc, substantially as herein specified and described.

40,544.—Refining Sorghum Juice and Syrup.—J. F. Sheldon, Pope Creek, Ill. Ante-dated Sept. 23, 1863 :

I claim treating sorghum or cane syrups successively with soda, cream of tartar and milk, by the process herein described and for the purposes specified.

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RE-ISSUES.

1,560.—Grain Drain.—Benjamin F. Field, Sheboygan Falls, Wis. Patented June 3, 1862:

I claim, first, The seed box or hopper, A, when so attached to the frame, B, by hinges or any equivalent device, that it may be turned completely upside down, in the manner and for the purpose set forth.

Second, The combination of the grain measuring slide, G, screw, f, thumb-nut, g, index, i, and dial, N, with the bottom, a, and shut-off slide, I, when arranged in the manner and for the purpose set forth.

Third, The combination of the compartments, E F, false bottom, a, slides, G I, tubes, J J, and chute, O, when arranged as described.

Fourth, The agitators consisting of elliptically-formed plates, p, secured in an oblique position on a horizontal shaft, q, arranged to operate in the manner and for the purpose set forth.

1,561.—Sugar Mold Carriage.—Theodore A. Havemeyer (assignee of T. A. Havemeyer & H. Schnitzpan), New York City. Patented March 18, 1862. Re-issued Sept. 22, 1863:

I claim, first, The employment or use in a sugar-mold carriage of a series of arms, f f, arranged or applied in pairs in such a manner as to be capable of being adjusted towards and from each other to grasp and retain molds of different sizes, substantially as set forth.

Second, In combination with the adjustable plates, G H, the frame, A, provided with recesses, k, to receive the tips, l, of the molds as specified.

Third, Providing the frame, A, with a recess, e, at its front part or end substantially as shown, to receive the caster-wheel, C, when said frame recess and caster wheel are used in combination with or applied to a sugar mold carriage, for the purpose herein specified.

Fourth, The hollow post, E, arranged to receive the arbor, c, of the caster wheel, C, and attached to the frame, A, to support the front end of the plates, G H, substantially as set forth.

Fifth, The combination, construction, and arrangement of the parts herein shown and described to operate as and for the purpose specified.

1,562.—Sewing Machine.—Charles Parham, Philadelphia, Pa. Patented Nov. 21, 1854:

I claim, first, So forming and constructing the shuttle driver of a sewing machine, that while it performs the required duty of driving the shuttle, it serves to maintain the latter in the desired proximity to the plate, C, as set forth.

Second, The combination of the driver, A, shuttle, B, and stationary plate, C, the whole being formed and arranged substantially as described so as to retain the shuttle during its flight, in its proper position for the purpose specified.

1,563.—Button.—Willard Robinson (assignee of John Hatch), Attleboro, Mass. Patented Feb. 20, 1845, and extended:

I claim the improved manufacture of a pantaloon button, as made of two metallic plates and having two or more eyelets each of which is formed with a countersink in each of the plates, and with the countersink of one plate arranged in reverse of that of the other, substantially as described,

1,564.—Smut Mill and Grain Separator.—Daniel Shaw, Chicago, Ill. Patented April 6, 1852:

I claim the combination and joint operation of a smut mill and an exhaust fan, grain separator, substantially as herein specified and set forth.

DESIGNS.

1,837.—Bottle.—E. D. Loveridge, Buffalo, N. Y.:

1,838.—Stove Plate.—Robert Ham [assignor to Frederick H. Sheldon & Chauncey O. Green], Troy, N. Y.:

EXTENSION.

6,830.—Flour Packer.—Nathan Kinman, Buffalo, N. Y. Patented Oct. 30, 1849:

I claim, first, The packing apparatus consisting of a combination of the tube, b, and inclined blades for condensing the flour and returning it while moving the barrel, substantially in the manner and for the purposes set forth.

Second, I claim the hollow shaft for expelling the air from the barrel in packing as above described, I also claim the self-acting clutch in combination with the packing apparatus in the manner above made known.

IMPORTANT TO INVENTORS.

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or rawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model of drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical productions he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by inventors throughout the country we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

Notes and Queries

R. W., of N. Y.—Bricks with a hole through a portion of them for the purpose of securing lightning rods are old. Such brick are used in England for this purpose.

H. J. S., of Maine.—The black letters which you notice upon tool handles are burned in with a branding iron. We supposed every body knew how it was done.

C. C., of Mass.—We would advise you not to delay your application for a patent on the horse-shoe machine. Inventors not unfrequently become involved in interference cases, and incur considerable expense by neglecting to apply promptly for their patents.

J. H. W., of Ohio.—It will not be safe for you to try and restore the blue color on the barrel and iron parts of your revolver nor the plating upon its lock. A blue color is given to steel by heating it to a certain degree (about 500° Fah.) after being polished. A piece of horn rubbed over polished heated iron gives it a dark shining surface. Keep your pistol clean, and use a mixture of sweet oil and beeswax for rubbing it up, and never allow it to become rusty again.

W. W., of N. Y.—We really cannot comply with your moderate request of allowing you "only three pages" to demolish the old theories respecting the mechanism of the heavens.

J. D. McG., of Pa.—Silvered glass is coated inside, not outside, as you suppose. You will find a mode of silvering glass described on page 244, present volume of the SCIENTIFIC AMERICAN.

E. A. R., of N. Y.—We cannot recommend for the library which you mention any "complete work on natural philosophy," because most of those which are published under the definition of "natural philosophy" are merely elementary school books, of which there are several very good of their kind, which you can obtain at any of our large book stores. Natural philosophy embraces all the physical sciences, and a good elementary work on the single science of chemistry alone embraces several large volumes.

J. H. V., of Cal.—Tapered bolts for the monitor turrets have been proposed scores of times by different persons.

A. C. C., of Wis.—You can obtain sufficient draft under your boiler by employing a blower, which may be preferable to the use of a tall chimney in your situation. For some marine boilers 9 square inches of space is allowed in the chimney per horse-power; and about double this for the fine area. There is no rule followed universally respecting the hight of boiler chimneys. Rules are given for their hight and width in all hand-books for mechanics, which you can consult—4 feet in hight being allowed for a horse-power to a land engine, and about the same collective area inside as that of the boiler flues.

W. J. V., of N. Y.—We do not know where pearl white door knobs are manufactured. You should apply to some hardware dealer.

C. T., of Pa.—Numbers of vessels are planked wholly with white oak. The Italian frigate recently built by Mr. W. H. Webb, in this city, is planked with a fine quality of the kind of timber you mention.

G. K. S., of Mich.—The Patent Office Reports for 1861-2 are not yet issued. They were delayed for want of an appropriation by Congress to print them. We expect they will now be issued very soon. We cannot furnish official reports of any kind. We can only get what we want ourselves.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, Nov. 4, to Wednesday, Nov. 11, 1863:—

H. L., of N. Y., $30; C. S., of N. Y., $28; B. & M., of N. Y., $13; G. S., of N. J., $12; T. N. & J. N. C., of N. Y., $20; J. C. L., of Mo., $20; A. W., of Iowa, $20; M. R. M., of N. Y., $16; L. O. C., of Pa., $16; G. W., of Iowa, $20; L. S., of Germany, 16; D. G. G., of N. Y., $20; R. H., of Mass., $16; J. M. F., of Ohio, $25; W. L. R., V., of N. Y., $25; H. H., of R. I., $32; J. D. H., of Pa., $16; R. T., of N. Y., $16; B. & B., of Ind, $12; G. C. K., of N. Y., $25; G. P. G., of N. Y., $50; C. E. L., of N. Y., $41; H. T. L., of N. J., $28; W. W. T., of Wis., $20; T. T., of Pa, $20; E. H. B, of Pa., $16; A. C. T., of Ill, $20; C. D., of Mo., $20; W. & C.; of N. Y., $20; J. F., of N. S., $20; W. R., of England, $20; W. & B., of Mass., $20; P. H., of Pa., $16; C. B. G, of N. Y., $41; J. S. W., of Pa., $16; E. H., of Cal, $20; S. N. T., of Wis, $15; J. W., of Iowa, $25: H. & D., of N. Y., $25; H. S., of N. Y., $25; N. B. H, of N. Y., $22; J. D. B., of N. Y., $25; E. H., of N. Y., $20; G. E. H., of N. Y., $20; L. B., of N. Y., $20; J. I. G., of Ohio, $16; J. A. & J. W. M., of Ind., $20; J. M., of Cal., $20; N. B. H., of N. Y., $22; D. E. C., of N. Y., $16; E. S., of N. Y., $10; G. S, of Pa., $16: C. W. B., of Conn., $10; A. G, of Pa., $19; J. L. K, of N. J., $16; O. D. D., of Mich., $16; T. F. B., of N. Y., $25; J. B., of La., $12; M. W. B., of Ind., $44; J. M., of Conn., $30; C. J., of Conn., $25; T. H., of N. H., $16; R. & Y., of N. Y., $40; C. C. A, of N. Y., $217; B. & G., of Conn., $16; B. W., of N. Y., $16; J. A., of N. Y., $16; J. K. B., of Ohio, $25; P. F., of N. Y., $150; J. S. G., of Mich., $15; C. F., of Iowa, $65; A. S. H., of Mich., $16; J. J. G, of Pa., $30.

Persons having remitted money to this office will please to examin the above list to see that their initials appear in it, and if they have not received an acknowledgement by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Nov. 4, to Wednesday, Nov. 11, 1863:—

G. C. K, of N. Y.; H. & D., of N. Y.; H. L., of N. Y.; C. E. L, of N. Y.; G. P. G, of N. Y. (2 cases); H. S., of N. Y.; C. S., of N. Y.; N. B. H, of N. Y.; B. & M., of N. Y.; H. T, L., of N. J., J. D. B., of N. Y.; G. S., of N. J.; C. E. L, of N. Y.; N. B. H., of N. Y.; L. D. B., of Ind; J. D. H., of Pa.; J. M., of Conn.; A. & F., of England; T. F. B., of N. Y.; J. W., of Iowa; W. H. T., of Cal.; J. B., of La.; J. K. B, of Ohio; J. M. F., of Ohio; B. & B., of Wis.; J. A. H., of Mass.; W. L. R. V., of N. Y; W. M. B., of Ind.; C. J., of Conn.

Back Numbers and Volumes of the Scientific American.

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2.25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI is out of print and cannot be supplied.

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TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

Binding the "Scientific American."

It is important that all works of reference should be well bound The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is prepared by a large class of its patrons, lawyers and others, for reference some complaints have been made that our past mode of binding in cloths not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that en words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement hey may deem objectionable.

$200, $150, $100, $50 PREMIUMS.—TO EDITORS, Ladies and Others. I will pay the above-named amounts for the best four articles on either my Soap, Saleratus, or Concentrated Potash. The article must state the writer's experience in using the goods, and must be not less than ten lines, and be published in the editorial columns of any good family newspaper. Any party wishing to compete for the above, and desiring further information, may address the undersigned. Each person writing and publishing a notice, as above, will mail a marked copy of the paper containing the notice to me, and also write me by mail, giving full address. The Premiums will be awarded on the fourth day of July, 1864. B. T. BABBITT, 64 to 74 Washington street, New York. 12 tf

NEW HAVEN, CONN., Oct. 22, 1863.

To B. T. BABBITT:

SIR:—Observing your Premium advertisement in the SCIENTIFIC AMERICAN, I concluded to state, in a few words, what I knew of the merits of your soap, having used it enough to conscientiously say that it is all that it is represented to be.

I wish to ask you if it is necessary to write my name in full under the article, should I put it in one of the New Haven papers.

If the article, which is on the next page, is of no account, please say so, and that will end the matter; if it is acceptable, it will appear in the paper immediately. J. D. W.

The right, golden day that ever gave
The world a man who cares to save
Sometimes the toil of womankind.
A man with an ingenious mind
Bestows a real gift to us;
Because experience proves it thus.
In every way its claims to aid,
Here's none but true assertions made.
Thus to affirm the truth we're bold,
Since using *this* we are not sold;
Saving our time and patience too—
Our friends will find this statement true.
A single trial, and you can
Perceive that BABBITT is the man.

J. D. W.

ECONOMY OF FUEL.—NO MORE SMOKE.—NO USE for Chimneys. Engineers, Gerners improved system for setting steam boilers with air-regulator and indestructible grate bars, effects a large saving of fuel, by insuring perfect combustion and using all the heat instead of wasting the same in the chimney. Owners of steam boilers and all kinds of manufacturing furnaces will consult their interests by sending for a pamphlet or calling at our office, it examine for themselves. Engineers and Scientific men are requested to call and examine this the most perfect system of combination. J. E. STEVENSON & CO., Civil Engineers, Agents, 200 Broadway, New York. 21 3*

EVANS'S PATENT WATER FRONT FORGE.—THE undersigned having purchased the entire right for this valuable invention, would call the attention of all parties using Lehigh fires for forging purposes to it. It will effectually protect the workmen from the heat, consume the gas, and will save from 25 to 33 per cent. of fuel over all other forges now known to the public. Please send for a circular. H. B. BIGELOW, No. 8 Whitney avenue, New Haven, Conn. 1*

A VALUABLE WORK FOR INVENTORS PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

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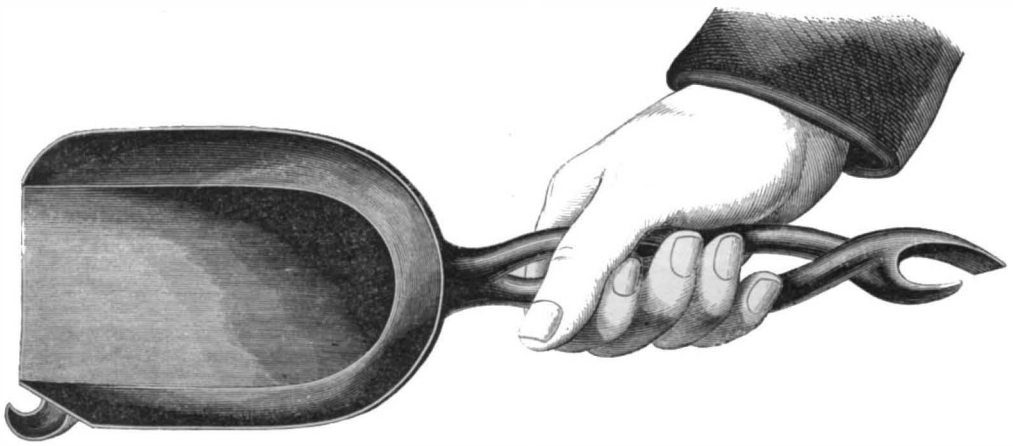
Improved Fire Shovel.

The idea of adapting one tool or instrument to many different uses is peculiarly American, and is very convenient in many instances. The inventor of the above improved fire shovel has evidently endeavored to lighten the labor of housekeeping, in accordance with suggestions we continually make to that effect. The intention is certainly most laudable, and the shovel or scoop, herewith illustrated, although a simple affair, is a very useful one. We have had occasion ourselves to replenish fires, and not finding any such article handy as the one published herewith, have successively burned our fingers, our pocket handkerchief and the lining of our coat

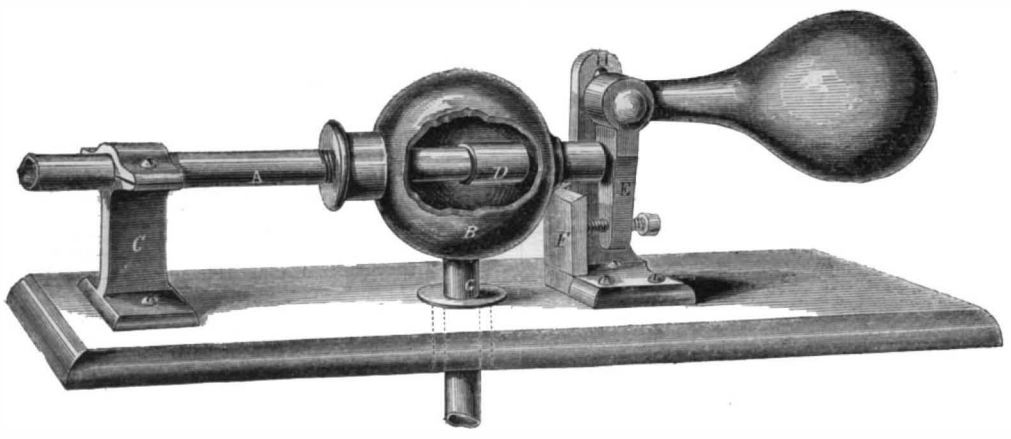


DAVIS'S FIRE SHOVEL.

skirt, to which we had resort in our despair at not finding anything else convenient. All such clumsy work may now be dispensed with, as the same shovel that contains the coal has also a little hook on one end, with which one need only tickle the door of a stove and it will fly open of itself. On the other end of the handle is a projection which is very convenient for lifting off the lids of stoves and ranges; so that all sorts of heating apparatus can be engineered with this scoop without difficulty. We were about to give directions for taking the coal up and placing it on the fire, but that part we leave for the inventor to explain to the individual purchaser. The shovel is made of cast-iron, and is, as may be seen at a glance, an extremely useful article and one that every housekeeper can find a place for. A patent was issued Oct. 27, 1863, to W. E. Davis, of Brooklyn, L. I. For further information address the inventor, at No. 89 Orange street, Brooklyn, L. I.

Improved Steam Trap.

It is well known that steam pipes when exposed



RAY'S IMPROVED STEAM TRAP.

to cold air, or temperatures less than that of the vapor within them, condense the same and form liquid which is a source of annoyance and not unfrequently of disaster. This latter is particularly the case with steam engines; on starting them after temporary stoppage large quantities of water accumulate at times, greatly endangering the safety of the machinery. So also it happens, occasionally, from defective construction or peculiar circumstances, that water is carried over into the cylinder with the steam, which if not removed immediately causes great damage. The engraving published herewith represents a self-acting apparatus to remedy the above trouble. It consists of a waste pipe, A, which is connected with the cylinder, radiator, or other apparatus it is desired to free from water, and the chamber, B. The waste pipe is screwed tightly to the chamber and has one extremity confined in a clamp, C, while the other end is faced off to form a valve seat for the plug, D, which enters the chamber opposite the pipe. The other parts are merely a weighted lever, E, and a stop, F. This trap is governed by the laws of expansion and contraction. It will be seen that as the waste pipe is filled with condensed water it shortens or contracts from cooling, and consequently recedes with the plug or valve, D. When this occurs, the water runs out through the opening formed at the plug into the discharge pipe, G, which moves with the chamber in a slot, as shown by dotted lines, with the contraction of the pipe, A. The pipe, A, chamber, and plug, all move together, but the plug works easily and the water pushes it out by its gravity.

The clamp, C, is placed at some distance from the chamber, so as to permit of a large opening on the valve end of it. As wrought-iron pipe expands about half an inch in 36 feet, at a temperature of 212° Fah., it will be seen that very free opening may be afforded for the escape of water, by merely placing the chamber 15 feet from the support of the pipe. The set screw is applied to regulate the amount of opening between the valve and its seat on the end of the waste pipe, in a manner sufficiently obvious without further explanation. This plug has no packing where it enters the chamber, there being no necessity for it; as when the pipe is closed the chamber is empty, and when open, the discharge at the bottom gives all the vapor free exit. The weighted lever can also be adjusted vertically, a slot being left for that purpose in the upright, H; thus affording an additional means of regulating the pressure on the plug. This invention was patented through the Scientific American Patent Agency, on July 7, 1863, by Willard L. Ray of North Adams, Mass.; for further information address A. J. and W. L. Ray, at that place.

The Perils of Ballooning.

On page 291, Vol. IX of the Scientific American, may be found an account of the great French balloon of M. Nadar. An excursion which was planned and executed came near turning out fatally, as the following paragraph testifies:—

"M. Nadar has been experimenting in France with a balloon called the 'Giant,' in which he intended to carry a number of passengers from one part of Europe to another. He had made one successful ascension, and on the 17th of October made another from the Champs de Mars, Paris, with several passengers. The balloon remained up seventeen hours, and traveled 250 leagues. It descended on the next day near Nieuburg, in Hanover, Germany, after dragging for several hours in consequence of the anchor having broken. M. Nadar had both his legs dislocated; his wife sustained a compression of the thorax and contusions on the leg; and M. Saint Felix, one of the passengers, experienced a dislocation of the left humerus, besides injuries on the face."

[The trip seems to have been anything but humorous.—Eds.

A monument to Fulton is about to be erected in Trinity Church yard. This is tardy justice.

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